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The Geographical Journal

Vol. LX No. 6 December 1922

THE MOUNT EVEREST EXPEDITION OF 1922

Read at the Joint Meeting of the Society and the Alpine Club, 16 October 1922. Map follows p. 452.

I. DARJEELING TO THE RONGBUK GLACIER BASE CAMP

Brig.-General the Hon. C. G. Bruce, C.B., Chief of the Expedition

ABOUT the beginning of the last week in March the whole of the members of the Mount Everest Expedition collected at Darjeeling. Previous to this the Staff of the Expedition had been in Darjeeling for nearly a month to make all the necessary arrangements, select the porters, and to receive from Calcutta the large amount of supplies which had been previously forwarded from England. On our arrival we found that our agent, Mr. Weatherall, had carried out the directions which we had previously sent him in the most efficient possible manner. Not only had he our large stocks of local supplies, grain, etc., all ready for transport and beautifully packed, but he had collected from the surrounding district at least 150 Bhotias and Sherpas from whom we could select our porters. He had also a large selection of cooks ready for us to choose from. All stores, as they were received in Calcutta, were forwarded by the Army and Navy Stores direct to Kalimpong Road, where they were received by one of our transport officers, Captain Morris, handed over to the contractors who had undertaken the transport of the Expedition, and forwarded by them with the greatest possible speed to Phari Dzong. Naturally this took a good deal of arranging, as the stores arrived in no less than four different consignments, the last consignment of all, the oxygen cylinders, actually arriving in Calcutta on or about the date that the Expedition left Darjeeling. Luckily, owing to the first-rate arrangements made for all the clearing and forwarding of our stores, there was no delay on the arrival of the ship in getting the oxygen to Kalimpong Road.

Although we had a great deal of work to do in Darjeeling itself, it was really most interesting. The selection of coolies alone was of great interest. We chose seventy-five of the best men we could find; they were put into the hospital for three days to be under the observation of the civil surgeon; the pick of them were re-selected on his report. We also had to select an interpreter, and we found a most excellent youth in

the person of Karma Paul, a Christian Tibetan. He was a lad who had done no work for Government previous to our engagement, and was rather a simple person filled with a quaint little vanity of his own. His one idea in coming with the Expedition, beyond the fact that he wished to travel in Tibet, was to get a good report from it with a view to permanent employment afterwards. He was very light-hearted in his outlook. When he was Karma he was a Buddhist, and received blessings from every Lama he could get near to. When he was Paul he was a Christian. Otherwise he did very well for us, and never lost his keenness right to the very end of the expedition. There was also the sardar who was employed by last year's Expedition. On this occasion he played up and did very well right through the expedition. However, a great number of his duties as sardar were unnecessary, as they were much more easily carried out by the officers of the Expedition themselves. He went as general utility man to a large extent, but was also in charge as sardar of Col. Strutt's party when they returned post-haste from Rongbuk to Darjeeling in June, and on that occasion he received a first-rate report, both from Col. Strutt and Dr. Longstaff. By this it must not be thought that he was a saint. Among his many backslidings he committed two sins of the first class; for one of which there was some excuse, for the second of which there was absolutely none. The first crime consisted in his having poisoned a well-known Lama at the head of the Dud Kosi. The second —an entirely unforgivable crime—was that he lost my ice-axe within four days of leaving Darjeeling.

Among the other followers of the Expedition were the cooks, a most important part. Having fixed on the men we thought were the most likely, my cousin and I took them out into the mountains and tested them as well as we could. I do not think there was any complaint whatever by any member of the expedition of the behaviour of the cooks, as will be seen later on, nor, under the conditions, of the quality of the food they gave us to eat; in fact, they were quite a feature.

We also provided ourselves with a cobbler; this cobbler has, I think, probably the distinction of being the absolutely thickest-headed person that I have ever met during the whole of my service in India. He did very well considering, his only complaint being towards the end that if he had known what was in front of him he would never have come. We had also a most excellent servant of the expedition called Chongay, whose first duty was the charge of the tents and stores. He did excellent service, and was ready to turn his hand to anything. A Lepcha plant collector was added to our personnel, and I must not forget to say that, owing to the kindness of the Commander-in-Chief in India, Lord Rawlinson, we had four young non-commissioned officers of the 2/6th Gurkhas attached to the expedition.

Before leaving Darjeeling we received a permit from the Dalai Lama authorizing us to travel in Tibet, and directing all his officers to give us

every possible assistance. As the permit mentions Mount Everest by name, I think now is the time to again refer to the name of the mountain. If you will look at the permit you will see that it is quite clearly called Chha-ma-lung-mo. Working this out I found that the Sherpas from the southern face of the Himalaya call the mountain by the name which I had got for it in 1909—Chho-mo-lung-mo, "the abode of the goddess"—which was confirmed afterwards by Dr. Kellas, and later by last year's Expedition; whereas on the north it is known by the name by which it is called in the Dalai Lama's permit. Chha-ma-lung-mo has been translated to me by Mr. Macdonald, the Trade Agent at Yatung, in two ways: first, as "the place of the female eagle," and secondly, as "the place where it is so high that even a bird goes blind when he gets there." I think we can take it that both names—with the small but important difference in the vowels—are in ordinary use.

Before we left Darjeeling, by invitation of the Buddhist Association and the Hillmen Association, all the members of the Expedition, including every one down to the cobbler, were entertained by these two Associations, and there, after much speech-making, we all received the blessing of the local Lamas and Brahmins. This gave the porters a particularly good send-off, and it is possible that their wonderful behaviour owed something to this stimulation. The Gurkha N.C.O.'s were doubly fortified, as they took blessings from both the Lamas and Brahmins, as also did the European members of the party.

A great gratification was a most kind telegram received from His Holiness the Pope just as the expedition was leaving Darjeeling; in fact, I think it arrived the actual day we took train. The telegram was as follows: "May God who lives in the heights bless the expedition."

By the kindness of the Himalayan Railway, the remaining heavy baggage and members of the party were moved round from Darjeeling to Kalimpong Road free. We all went round the Teesta valley in the normal manner, with the exception of Captain Noel, who elected to ride on the roof of the train with his cinema-camera and take records of that wonderful place. The valley could not really do itself justice, as we had had no less than a full month of fine weather, and the hot-weather haze rather obscured and belittled the scenery, besides tending to dry up the gorgeous tropical vegetation and jungle.

From Kalimpong the party broke into two for our journey to Phari Dzong in Tibet. On the whole we had a very comfortable march indeed through Sikkim and over the Jelep La to Chumbi, though we ran into rather rough weather from Gnatong for a march and a half over the pass. We also made acquaintance with the wonderful Chumbi mule transport. These mule-men work regularly seven months in the year carrying wool from Tibet down to Kalimpong, and they thoroughly understand the art of loading and travelling the mules. Not only that, but they march at the most astounding pace. The continual hard labour, I am afraid,

rather makes sore backs, but this is also largely due to the enormous and continual ascents and descents between a very cold climate and a very warm one.

The march through Sikkim in fine weather is, at any rate, a wonderful experience. After the very deep tropical valleys, it is very strange to emerge at Gnatong into what one might almost describe as uplands, from which more or less minor peaks rise, the whole country giving one quite an impression of the Scottish highlands in spring, both from the colouring and from the amount of snow on the mountains themselves. In the Western Himalaya snow lies many feet deep right into May down to a height of 11,000 feet, or even below, but here at the end of March we were troubled in no way by deep snow, and many of the peaks up to 15,000 feet appeared to be almost clear of winter snow. Most of the great amount of moisture deposited on these ranges falls during the summer months, the winter months being comparatively dry.

The descent into Chumbi, as it always is, was very striking. One leaves Sikkim behind and enters a valley which reminds one much more of the west than of the east. At Chumbi itself we were entertained by the Trade Agent, Mr. Macdonald, who accompanied us afterwards up to Phari Dzong. The road from Chumbi to Phari Dzong is again rather different in type, but quite beautiful in its way, and as wild as it is possible to make a forested gorge. It is very striking, emerging from the black and forested gorge of the Ammo Chu (the Chumbi river) on to the bare plateaux of Tibet.

When we were crossing the Jelep La we got a first-rate view of Chomolhari, which is 23,800 feet high, and stands right over the fort of Phari Dzong. It shot up into the air, doing full justice to its real height, and looked enormous. I collected the members of the Expedition who were with me, and I said, in order to encourage them, pointing to the top of Chomolhari: "Your advanced base camp will be very nearly as high as the top of that mountain over there." This seemed to amuse them very much, especially as there were great streamers of snow blowing off the summit.

On arrival in Phari we found all our stores collected, and also the whole of our tents pitched and mended by our excellent tindel Chongay, who had gone on before. The chief business we had to do at Phari was making our first contract for moving our enormous collection of stores by the local transport. Early in the year all Tibetan animals are in very poor condition, and it was apparent that this must be so. Everything was frozen up and dried, and it is a wonder how the animals themselves manage to keep alive at all on the amount of grass to be seen on the hill-side. However, we finally arranged to move from Phari in two days, but we were also obliged to take with us 50 of the Chumbi mules to complete the transport required. Ultimately our transport consisted of some 320 mules, yaks, cows, and donkeys, eked out with 15 or 20 coolies.

In order to save time we had determined to go by the short cut to Kampa Dzong, and contracted with the Dzongpens to get there in four days with 100 animals, 50 of whom were the Chumbi mules, and it was the greatest possible luck for us that we were able to take these same 50 mules. Two hundred yaks were to arrive in Kampa Dzong in six days, and we arranged for them to march with the sardar Gyaljen and two of the Gurhka non-commissioned officers, Hurke Gurung and Lal Sing Gurung, the other two N.C.O.'s being in charge of the treasure chests and marching with the advance party.

We all now collected in Phari with the exception of Mr. Crawford and Captain Finch, who remained behind at Kalimpong to bring on the oxygen. We left Phari on the morning of April 8 in bad weather, which very rapidly degenerated, until the wind was blowing half a hurricane and it was snowing very heavily. After a most unpleasant march of 16 to 17 miles we managed to make a camp, and it was here that we found the great advantage of having kept 50 of our Chumbi mules. The rest of the animals with the advance party drifted in up to ten o'clock at night. The camp was deep in snow, and the cold was rather severe. This was not exactly an encouraging entry to Tibetan travel.

The following day was a really magnificent march, but exceedingly trying. The wind was very high, but the weather perfect in other ways. The road led us over three great ridges, all being part of a great northerly ridge running from the northern slopes of Pawhunri, all these ridges being 17,000 feet above the sea, more or less. It was an exceedingly cold march, and very trying to men and animals. We finally camped under some small cliffs at a place called Hung Zung Tak; animals not arriving again many of them until ten o'clock at night, but the position was saved by our 50 Chumbi mules. We waited the next day, as the animals were completely tired out. This was partly due to the fact that owing to the snow at the last camp there had been a minimum amount of grazing and rest for the animals. The men, too, required cooked food, as no fuel of any kind was available at the previous camp. It was a good test of the stamina of the porters, none of whom suffered, although three on the second march who had stayed behind were benighted and stayed out all night just as they were, without bedding, being retrieved the following day perfectly happy. The running stream by our camp was frozen absolutely solid during the night.

On April 11 we marched to Kampa Dzong, leaving the nunnery of Tatsang on our right, and on our way passing through a great quantity of game. At Kampa Dzong we halted three days owing to difficulty in collecting such an immense mass of transport, and we were joined by Captain Finch and Mr. Crawford, who had had a very rough time crossing the Jelep. The blizzard which caught us on our visit to Phari had caught them on the Jelep, and so heavy had been the snow that it had lain 6 inches deep at Yatung and Chumbi, which are only 9800 feet above the sea.

Every member of the Expedition was provided with a riding-pony, as it was found that continuous walking without rest on these heights was likely not to improve the condition but to exhaust, whereas a mixture of riding and walking would gradually acclimatize and bring them into training. We were most particular also to see that all our porters were well clad and warm at night and well fed, and whenever possible we added to their ration allowance by buying them meat and any other local comforts that could be found.

From Kampa Dzong our road led us *viâ* the fort of Tinki to Shekar Dzong, and this, being over the same country as was travelled last year, requires no particular description. Shekar Dzong is most wonderfully situated and very striking as one approaches it. Shekar, I believe, means "shining glass," and from the white exterior of the forts and town situated on the brown slopes of the mountain it is a very suitable name. At Shekar we found an enormous number of lamas, and I think that the priests were even dirtier, if possible, than at Phari Dzong. If you happen to smack a young lama friendly on the back, say, a flake of dirt falls off. They are perfectly astonishing in their dirt. This, however, does not apply to the Dzongpens or others of position, for in this part of Tibet the Dzongpens wash on New Year's night, and I think—I think—their wives do also.

From Shekar our road led across the Arun *viâ* the Pangla La down into the valley of the Dzakar Chu, thence following that valley up to the Rongbuk monastery in the Rongbuk valley.

Our last march up the Dzakar Chu into the Rongbuk valley was exceedingly interesting. The valley itself is deadly bare and barren, and the mountains are great horrible humps with nothing on them. One suddenly arrives where the valley opens on to the Rongbuk monastery. It is wonderfully new and clean for a Tibetan monastery, and even its lamas in this respect take after the monastery. The Head Lama of Rongbuk was a very interesting character. He is of extreme sanctity, and pilgrimages are made to his monastery; and further, the Dalai Lama visits the Rongbuk monastery yearly by proxy. The Lama of Rongbuk has the distinction of being an incarnation, not of Buddha, but of a god, the God Chongraysay, who owns no fewer than nine faces, and this particular lama himself is reputed to be able to change his face as he likes. He received us extremely well, and was a most striking and interesting old gentleman with perfect manners and perfect courtesy—far the finest type that we had yet struck. Of course there was the usual Tibetan tea. This is most appalling, having butter, generally rancid, salt, and other ingredients added, and the whole churned up before being served.

There is a local belief—or possibly even more than local, as we found it in the Chumbi valley equally—that many years ago during a previous incarnation this lama was challenged by a Pembo lama, who was also a magician, to race to the top of Mount Everest; the lama having agreed, the Pembo lama jumped on his magic drum and, beating it for all he was

worth, started off on the drum to the top of the mountain. After the Pembo lama had nearly reached the top the followers of the Rongbuk lama suggested his starting. Just then the sun rose; the Rongbuk lama, leaping on a ray, was carried to the summit in triumph.

The Rongbuk lama was very anxious to know what was the reason for all the trouble we were taking to explore Mount Everest. I thought that my best way to explain it was that we treated the expedition as a pilgrimage, and that it was an attempt to reach the highest point of the Earth as being the nearest to Heaven. This point of view was accepted. I added also, with a view to my own comfort, that I had registered a vow never to touch butter until I arrived on the summit. I dislike butter at any time, and Tibetan tea was absolutely the limit. From that time on I drank it without sugar or milk. We took the opportunity here of having our men blessed.

From the Rongbuk monastery the whole southern end of the valley is filled by Mount Everest. In a way this particular view is very striking, but I personally regretted the presence of those horrible humps which form the Rongbuk valley. In my opinion they belittle and, if possible, bemean the great mountain range, besides committing the obvious crime of shutting out the gorgeous mountains to its right and left.

We hoped to be able to push on and take the whole of our heavy luggage beyond the snout of the Rongbuk glacier, but our transport would have none of it, and rightly so; halting here we established our base at a height of 16,500 feet and collected our full stores, and a very imposing mass they made. Owing to the work of the reconnaissance of 1921 and to the fine survey carried out by Major Morshead and Major Wheeler, we knew now fairly well the line of our advance. From Wheeler's map it was quite apparent that our line must be up the East Rongbuk glacier, but a detailed reconnaissance had to be carried out in order that we could lay out a series of camps and make an advance base before attacking the mountain. Therefore, while the staff of the Expedition was establishing the base camp and Captain Finch was getting his oxygen apparatus into order, Colonel Strutt, Dr. Longstaff, Major Morshead, and Major Norton started out to make full reconnaissance of the East Rongbuk glacier. It was quite apparent that the work of establishing the camps and of making a further advanced mountaineering base on the Chang La would be very severe indeed. On these camps being fully rationed, fully provisioned, and supplied with fuel, would depend the success of the attack on the mountain itself. Evidently there was an enormous amount of stuff to be moved, and it was also apparent that, owing to the very short time at our disposal, none must be lost. Moreover, to employ our own porters in moving the stores themselves would not only take a long time but would greatly exhaust the porters, and then they would not be near their full strength for moving camps as high as possible on the mountain. We had very carefully looked after these

men, and it would have been poor economy to overwork them before it was necessary.

I do not think that I have explained that the whole problem of climbing Mount Everest was one of pace. Owing to the severity of the winter and early spring, it would not pay to start earlier than we did, and in fact we had a quite low enough temperature as it was on our arrival in our base camp. In a good year we could count on respectable weather only up to June 15. In an early year the weather might break up any time after June 1. So that the problem was really a race against the monsoon.

Our base camp was now established on May 1. We could therefore say that we had our time divided up as follows: We aimed at getting our camp on the Chang La or North Col by May 15, and that would give us fifteen days for certain, twenty-one days with decent luck, and a month if our luck was really good, to work on the mountain itself. We considered this would probably be ample if these dates could be adhered to. I therefore strove by every means in my power to collect a sufficient number of porters to assist our own men. It must be understood though that the Dzakar Chu and neighbouring part of Tibet is very sparsely populated, and not only that, but the ploughing season and spring were approaching and it was absolutely necessary for these people to work on their fields. I had been given a promise of 90 porters to help, but only 45 were forthcoming. After two days' work these 45 said that their provisions were done and they must go for more. Taking the best guarantees we could, we let them go, but they never appeared again, so we had to set to work with our own men to move as much stuff as we possibly could and get the Expedition forward. At the same time we used the agent of the Shekar Dzongpen and our own sardar to scour and scrape the entire Dzakar Chu for porters. In order to get them we had to offer very high wages. These porters came up in batches, sometimes ten, sometimes half a dozen, sometimes five-and-twenty. They worked for short periods and then went away to their ploughing, but under these conditions and with a little arrangement we were able to get our work done.

We established a staging system up the East Rongbuk glacier, making Camps I., II., and III. as shown on the map. Each of these camps was fully rationed and supplied with a cook. This of course was done gradually, everything being pushed up in batches, and here the value of our transport officers and of our Gurkha N.C.O.'s came in. They were given charge of different stages. The Tibetan coolies could be used only for the first two stages; our own porters moved everything from Camp II. to Camp III.; and also great quantities of stores right up from the base camp to Camp III. The approximate heights were: The base camp 16,500 feet; Camp I. 17,800 feet; Camp II. 19,800 feet; Camp III. 21,000 feet. This required the most continuous hard work. I do not think ever before in the history of Himalayan exploration have

men been called on to do harder, or even as hard, work. I think their performance was absolutely without precedent. The track itself was very rough, the elevation was very great, and yet these men put a full month's stores into these camps sufficient to keep 12 Europeans and 50 of themselves. They also carried the great oxygen outfit, tents, and alpine equipment and an immense mass of stuff. Further than that, as soon as these camps were established they moved what was required to form the base at the Chang La, Camp IV., and from there carried loads for the first climbing party to 25,000 feet, and for the second party to 25,500 feet. I may point out that only on one occasion before has a camp been slept in for one night at 23,000 feet. This camp on Chang La was continually occupied by quite large parties, as mountaineering parties go. One man even made four trips to the 25,000 camp, on one occasion carrying as much as 40 lbs.

During the whole of this period the climbing parties themselves were being pushed up to the different camps, the transport officers taking charge of the lines of communication, headed by a party of climbers who were quickly established at Camp III., whence Mr. Mallory and Dr. Somervell prepared the road up to the North Col. Finally, the whole of the climbing party was assembled at Camp III.

While we were at the base camp our Sherpa coolies were visited by some of their relations, men, women, and children, who had come up from the great Sherpa settlements of Sola-Khombu and across the Nghaugha or Khombu La, which is 19,000 feet, and then up to our camp, some of the wives even carrying babies of six months old over this pass, and sleeping out in the open under rocks the whole time.

I am not going to touch on any of the mountaineering, as I am leaving that for Colonel Strutt, Mr. Mallory, and Captain Finch, but I must mention the way the porters took the accident. Two of them lost brothers, and others their special friends, but not a single man has shown any desire not to return; in fact, in Darjeeling on our return every single man volunteered for the next year. One man on the way down pressed me several times to know whether he might go back with a friend and try and retrieve stuff that we had left at the North Col. After the accident the Lama at Rongbuk played up very well. I paid money for services to be said in the monastery for the men who were lost, and he went out of his way to send for the porters and again bless them, which they thought a great deal of.

But Sherpas and high-living Nepalis have this belief: When there is an accident, and a man falls either in the high mountains or from a cliff into the river, it is called "Parmeshwar ko balidhan bhayo," which means "a sacrifice to God," and they believe that if any one visits the same place *on the same date and hour* he will equally fall and be killed.

When the camps were moved down after our last attempt under the direction of Captain Morris, he told me that it was perfectly wonderful

to see the effect of the south wind even in the two days that he was evacuating the camps. Whole hillsides had become rotten, and even the great seracs, which are shown in the pictures so clearly, had begun to tumble down, and the great trough in the glacier which Colonel Strutt will describe, was filled in no time with a rushing stream. As long as the west wind, the great enemy of all climbing at this end of the Himalaya, is blowing, the mountain is generally in a fairly safe and firm condition. Though the west wind is a horrible wind blowing the whole length of the Himalayas and inconceivably cold, still it is dry. The south monsoon winds are warm and wet and destructive.

One thing that was proved is that woollen garments for very great heights are not sufficient in themselves, and that it is necessary to have wind-proof outer clothes. I think it is extremely likely that the break-down of Tejbir, the Gurkha who went so high with Captain Finch and with Captain Geoffrey Bruce, is due to the fact that he had no wind-proof clothing.

It is not my province to-night to touch either on the mountaineering efforts of the party or on the oxygen apparatus, but I may point out that the experiences of the Expedition must very much modify the scientific outlook on the power of ascending to great altitudes, on acclimatization, and on the manner in which oxygen should be employed.

Although I am not touching on the mountaineering side of the Expedition, I must here tender my thanks and the thanks of us all to my two transport officers, Captain Geoffrey Bruce and Captain Morris, for their hard and unselfish labours, and in one particular especially to Captain Morris, who counteracted the effect of my rather peculiar handwriting, thus making it possible for me to communicate with the President of the Mount Everest Committee. The thanks of all of us are also especially due to Captain Noel, the official photographer, for his unremitting and astonishing enthusiasm; the wonderful success which he has obtained we shall not be able fully to realize until we are able to enjoy his major work, the films.

Finally, before leaving Darjeeling Major Morshead gave me the latest figures of the two magnificent attempts made by the climbing parties on Everest. The first party—Major Norton, Dr. Somervell, and Mr. Mallory—reached a height of 26,985 feet, which is 185 feet higher than our first computation. The climb of Captain Finch and Captain Bruce works out at 27,235 feet. I am sure you will be glad to hear that Major Morshead's numerous frostbites are getting on very well indeed, and that he will not be incapacitated in any way, nor his profession in life interfered with.

I will bring my part of the account of this expedition to an end with a little story. On our way back to India we were met by a Babu in a good position. He said: "Sir, I hear you have climbed the Himal by means of thread—no doubt the thread of life."

THE EAST RONGBUK GLACIER

Lieut.-Colonel E. L. Strutt, D.S.O., Second in Command of the Expedition

On May 2 with Norton, Finch, two Gurkhas and one coolie I started, under General Bruce's instructions, to find a site for No. I. Camp. We took to the rocky terraces high above the right bank of the Rongbuk glacier, which really constitute the lateral moraine of that glacier. Going very slowly but steadily over a quite good surface, we eventually reached the corner above the large opening where the east branch meets or did meet, the main Rongbuk glacier. Here the conditions changed and we descended towards the snout of the tributary glacier over abominably loose and slippery moraine. At a spot some 300 yards distant from the snout of the East Rongbuk we chose a site for the first camp. The place was sheltered, and it may here be remarked that this camp proved satisfactory and was perhaps the warmest spot that I struck in Tibet. The height is about 18,000 feet, and it is an easy three hours up, or one and a half hours down, from the Base Camp.

On the way back we took to the trough between the glacier and the moraine, which the coolies who were following us up with Morris appeared to have instinctively preferred. The terrace route was however the best, as was proved later when repeated bursts of a glacier lake occurred and flooded the trough. Morris at once set to work to build sangars in the camp. We returned to the base at 16.20, having proved to our complete satisfaction, on the ice and snow in the trough, the vile quality of the Swiss Oberland axes that Finch and I were supplied with. The day was fine, as was the following one, but heavy snow fell all day on May 4 in the Base Camp.

May 5.—The day broke brilliantly and the snow soon evaporated, the ground remaining dry and quite unaffected. Bruce had arranged that I should start on the first reconnaissance this day. I was given *carte blanche* as to my party. I chose Longstaff, Morshead, and Norton. They proved an ideal party, full of energy and experience and not too young. Morshead and Norton are blessed with the sweetest tempers and dispositions, while Longstaff and I, who are gifted with just the reverse, were able, on the strength of a friendship of many years' standing, to curse each other freely and without malice. We left the base at 09.45 with sixteen coolies. All were heavily laden, that is to say, the coolies were carrying about 60 lbs. and I about 20 lbs. The day remained fine and warm and the walk up to No. I. Camp *viâ* the trough was quite hot. We got into camp at 12.45 and found it already comfortably installed, thanks to Morris's and Geoffrey Bruce's exertions of the previous day. Norton and Morshead, who generally enjoyed the privilege of a little extra work, set out to explore the

further route up the East Rongbuk. A good night was spent, all four sleeping in a sangar with a canvas top over it.

May 6.—We left at 07.30 in fine weather and at once took to the left lateral moraine of the glacier. Subsequent experience in the descent caused us to modify this route and to choose the western medial moraine, over which an admirable path was soon automatically constructed by the passage of many heavily laden coolies. The going was atrocious and very slow, and no one, not even Morshead, appeared anxious to lead, at any rate I usually found myself *en tête*. At 11.50, in somewhat weary condition, we found ourselves on the bank of the large lateral glacier flowing from the west into the East Rongbuk, which glacier descends steeply from the peaks constituting the northerly spurs of the north peak of Everest. This glacier, consisting of hard slippery ice, had to be crossed, but I suspected the presence of a cliff near its point of junction, *i.e.* approximately point 19,360 feet of Major Wheeler's admirable map. Accordingly, I altered the course of the somewhat jaded party from due south to south-west, and halting them on the moraine proceeded to cross the tributary glacier, steering for point 20,590 well above us. There were ice cliffs in many directions, but I was nevertheless able to cross the glacier without difficulty and to return to the party. As it was late, we camped where I had left them. As it was obvious that this camp was unsuitable, Morshead and Norton returned later in the evening to the East Rongbuk glacier, and taking with some difficulty to the medial moraine, found a more or less sheltered moraine slope between the ice of the two glaciers, which entailed no subsequent ascent or descent *en route*. The weather was bleak and cold and snow fell in the night.

May 7.—We struck camp and got away at 07.30, descending to the East Rongbuk. In half an hour we reached the site for No. II. Camp, and dumped the heavy loads. It was a strange spot, point 19,360, with a high moraine opposite (east), and enormous ice cliffs with a frozen lake at their base to the north. Leaving Longstaff and all the coolies, except one, there to pitch the camp, Morshead, Norton, and I, with Namgya my own particular Bhotia, proceeded up the left lateral moraine of the East Rongbuk. After an hour's bad going over the stones we came to the spot where the next very large glacier descending from the south-west cuts across our route. To our right were high rotten schist-like cliffs, and to our left enormously high séracs or rather, perhaps, ice pyramids. Some of these pyramids must be from 150 to 300 feet high, growing in places out of moraine channels, in others out of the parent ice. It was obvious that we must take to the East Rongbuk ice at once. Building a cairn at the spot where we must leave the stones, we turned sharply east and forced a passage through the séracs. It appeared to be difficult but was really not so, at any rate to any one with much ice experience. In half an hour or so we emerged on smooth ice near the centre of the glacier; we now turned south-east and bore up the glacier, the point of

direction being approximately 22,340 some miles away and east of the great gap subsequently christened Rapiu La, on account of its genial climate. Soon, to our disgust, we came to an enormous trough or trench, shown on Wheeler's map, which seams the whole glacier from south to north, starting from near point 20,100 and continuing, for all I know, right down to the snout of the East Rongbuk. This trench is about 300 to 400 yards wide and some 100 feet deep; it is paved in many places with gravel-like moraine.

Some one thought that we should do better nearer the north peak, so avoiding the trench we bore to the south, steering for point 22,090 feet high above us. The heat was great, and we experienced our first real symptoms of mountain lassitude. It was here that, for the first and last time, I appeared to suffer less than my younger companions. We came to the névé slopes below 22,090, somewhere near 20,100, and commenced skirting towards the corner on our right front (south), round which we knew that Everest would become visible. The slopes were steep and slippery, step-cutting becoming occasionally necessary; we were always being driven too high, and about 13.00 hours the inevitable occurred: a great range of ice cliffs, 300 to 500 feet high, cut off all further progress. We turned sharp down to the left (east), and endeavoured to regain the glacier. The trench was by now left far behind us and to the north. The going was very bad, and although the route between the glacier and the north peak slopes was possible, it was very long and far too fatiguing for the laden coolies who must use it. We were all agreed that we must return to No. II. Camp, and on the following day cross the great trench and mount by the glacier throughout. We accordingly turned about and proceeded home. Morshead lagged behind, and I was hoping that it was fatigue overcoming him; however, he rejoined us near the séracs and informed us that he had been looking at the trench, had found a feasible spot, and had actually descended and crossed it. This was a fine performance, as well as a great relief, as I had been fearing prolonged step-cutting. It should be remembered that our whole object was to find an easy route where laden coolies could proceed without the assistance of the European climbers.

We returned to camp about 18.30. Longstaff, who had not accompanied us on account of what he described as old age, was ill with a sharp attack of what appeared to be influenza and which he had experienced before on his many Himalayan expeditions. We were all rather alarmed at his condition. My companions, including the invaluable Namgya, appeared to be very fit again, and Morshead, whose appetite, like his walking powers, is unsurpassable, consumed fourteen bowls of Hoosh. Two were sufficient for Norton and one for myself.

May 8.—We left camp at 07.55, with eight coolies carrying three tents and some food. Longstaff was no better and had to remain in bed. We took the same route as the day before and crossed the trench at the spot

discovered by Morshead; a large cairn consisting of rocks from the bottom of the trench was erected, and a Gurkha signalling flag was fixed in a sérac to mark the exit on the further side. We now struck the first snow at a height of about 20,000 feet; it was thin and the ice terribly hard and slippery underneath. As we approached the corner previously referred to, the wind rose and the cold became great; both these, however, diminished as we rounded the corner, and Everest suddenly burst on us in all his majesty at a distance of only about 2 miles.

The glacier began to become crevassed, and we roped ourselves and the coolies in three parties; at 12.27 we reached the spot selected by Longstaff months before as suitable for the advanced camp. It is a dreary strip of moraine between the glacier and the cliffs of the north peak. The scenery can be described as the very soul of utter desolation. To the south towers Everest, or rather the eastern half of the north face. This small portion is alone double or treble in size of any mountain that I have seen in Europe: the shoulder, point 27,390, is the highest point visible and appears overwhelmingly remote, although not 2 miles distant. To the west are the glittering ice slopes of the Chang La (North Col), and to the immediate north the steep broken rocks of Changtse's eastern arête. Down the glacier to the north are the inexpressibly dreary and hideous slopes of Kartaphu and his lower satellites. This spot (No. III. Camp, about 21,000 feet) is supposed to be sheltered from the west wind and is sufficiently protected against stone fall from Changtse. I should again like to pay a humble tribute to Wheeler's map and Longstaff's topographical instinct. We dumped our stores and rested for an hour or more in the only warm sunshine I ever experienced in No. III. At 13.45 we again tied up and, with the coolies unladen and going at express speed, attained No. II. Camp in about two hours. Longstaff's condition was still rather alarming, but he was very cheerful.

May 9.—Longstaff and three coolies left early, so as to be able to go slowly, *en route* for No. I. We others followed at 08.30. Keeping on the medial moraine and constructing many cairns, we reached No. I. Camp, a scene of great activity, in about three hours. Here we left Longstaff in good hands, and reached the base camp about 14.30. The reconnaissance had been a success, and we experienced the finest weather of the whole trip.

May 10.—Longstaff was carried down in the morning, and Mallory left for No. III. Camp with Somervell and forty of other ranks. Three bitterly cold days followed, but on May 14 Norton, Morshead, and myself, together with seven coolies, again set out for No. III., reaching No. II. in some seven hours' very easy going. The tracks had improved beyond all knowledge, thanks to the endless stream of traffic, and Morshead led most of the way at his usual terrible speed; the weather was fine. On the following day, May 15, with thirty-six coolies we set out for No. III. The men went admirably, but much of the snow on the glacier had

evaporated, and the ice was exceedingly slippery. Crampons were accordingly tried by some of the men—the only use that I saw made of these encumbrances. I may be prejudiced, but crampons appear to be effective only on level ice where slips are of no importance. We reached camp about midday, and found Mallory and Somervell just returned from the North Col, where they had been fixing ropes for the use of the coolies over the steeper parts.

May 16 was a very cold day, and we remained shivering in camp, every now and then assailed by furious blasts of down-draught from the westerly gale raging above.

May 17.—Morshead, Norton, Somervell, Mallory and I, with ten coolies, set out for the North Col, leaving at 09.15. We were roped in three parties, and followed in the steps cut by Mallory two days previously. Many of these, especially in the neighbourhood of the bergschrund, the scene of the tragedy of June 7, had to be remade. My companions, Europeans as well as natives, appeared to make light of the toil, but my wind grew steadily worse. I was soon obliged to give up the lead of my own particular party, and to tie myself on in rear. As there was no improvement I eventually untied myself altogether. Freed from the weight of the rope between myself and the next man—possibly half a pound—I was able to keep up with some comfort; at any rate, we reached the summit of the pass at 13.45. The heavily laden coolies—some were carrying about 60 lbs.—appeared in no way distressed; neither did I —when sitting down! The eastern slopes of the Chang La are steep in places. [It is always difficult to make comparisons, but for the benefit of mountaineers, I should compare it to the northern face of the Col Tournanche between the Matterhorn and Dent d'Hérens.] Owing to driving mists there was no distant view to the west, but the crossing of the col from east to west, or better in the reverse direction, appears to me perfectly feasible. Great care in selecting a route would, of course, be necessary, and the chronic gale from the west would be a terrible obstacle. Our route is the proper one to the summit of Everest. The Changtse rises grandly to the north, obviously a prolonged piece of step-cutting along a most exposed and precipitous ice ridge. Leaving several tents and our loads, we started down at 14.20. Although unable to lead, I found that I could still come down as last man, Mallory and I taking a party of six coolies down. With a little encouragement from above they showed great skill and care.

We were back at No. III. by 16.00. It was by now quite certain that the first attempt on the summit of Everest should be made by Somervell, Mallory, Norton, and Morshead. I was going infinitely worse than any of these; the first expedition, on account of there only being two Meade tents available for the 25,000 feet camp, should consist of not more than four Europeans. I had to choose between Morshead and myself, and I naturally chose the former.

I should, before completing this part of the lecture, like to make a few remarks on the first attempt on the summit. Before and while this attempt was being made there were in No. III. Camp beside myself, Finch, Geoffrey Bruce, and Wakefield; while Morris and Noel arrived on May 21. So bad was the weather on May 21 that I was anxious about the safety of the high altitude party. During the morning and early afternoon, Finch, Bruce, and a party of coolies stood by to start as soon as the conditions became at all possible. Over a foot of snow fell during the day in No. III. Camp, and the weather was bitter in the extreme. In the event of Finch being able to start with a relief party, I gave him written instructions not to proceed beyond the 25,000 feet camp in the existing conditions. Fortunately it cleared a little towards evening, and the party were observed descending to the Chang La camp.

On the early morning of May 22, the temperature being then -9° Fahr., Finch and Bruce, using oxygen, with a party of coolies, started for the col, Wakefield being added to the party in case medical assistance was required. These met the high climbing party returning, and Wakefield accompanied them to No. III.

It may be asked why the attempt was made on May 21 without Captain Finch and without oxygen. My reply to this question is as follows: Finch had been ill at the Base Camp, and had not been able to put the oxygen apparatus into working order. He alone of all the members of the Expedition was conversant with its complicated inner economy. The coolies had been working like slaves getting up the absolute necessities, such as food and tents; it had consequently been impossible to bring up the oxygen cylinders, and, moreover, as I have stated, Finch had been too ill to test them. The weather was too uncertain to wait, and the monsoon might break at any moment. It seemed to me then, as it does now, that it was better to try and fail than never to have tried at all.

THE FIRST HIGH CLIMB

George Leigh Mallory

WHEN first the prospect of going to Mount Everest opened for me I used to visualize the expedition in my thoughts as a series of tremendous panting efforts up the final slopes. Later it became a symbol of adventure; I imagined, not so much doing anything of my own will, but rather being led by stupendous circumstances into strange and wonderful situations. Now it has become a problem; with no less interest, and even excitement, the Expedition brings to my mind's eye a view of the long mountain slopes set at intervals with groups of little tents, with loads of stores and sleeping-sacks, and with men. My object at present is to state this problem—partly because without it the story of our

attempts cannot well be understood, and partly because the problem is still with us. Everest is not yet climbed. Nor do we know for certain that it can be climbed. But we may see how much nearer we are to a solution as a result of this year's Expedition.

The first element in this problem is to supply a camp one stage below the North Col. The reconnaissance of last year had made it plain that this could be done, but it seemed not unlikely with too great a strain; the difficulty is in bringing the porters fresh to this point. General Bruce has proved that this can be done, at all events with his guidance, and we were able to set out this year from our camp at 21,000 feet with full confidence that our porters were in the best of strength and spirits.

The problem of climbing the mountain from that point to the summit, from 21,000 to 29,000 feet, was left after last year's Expedition briefly thus: a way to the North Col at 23,000 feet had been found in September, but it was by no means certain that this way would prove convenient, or even serve at all in May and June before the monsoon. Upwards from the North Col it was fairly certain that no great obstacle would present itself below the final ridge, and it seemed probable that the true north-east ridge to the summit, if it could be reached, would not be insuperable. Our experience in 1921 had also pointed to the period before the monsoon as offering the best chances of favourable weather. In such conditions as prevailed after the monsoon last year it was at all events certain that Mount Everest could not be climbed. Supposing, then, that all the conditions of the mountain should turn out for the best, what were the chances of success? It was known that men could climb to a height of 24,600 feet—the Duke of Abruzzi's record. It was certain, therefore, that they could exist a great deal higher, for the difference between breathing at rest and breathing with the effort of climbing up is immense. My own experience led me to believe that it would be possible to climb at least to 26,000 feet, and probably in one day, from the North Col. But the ultimate limit would be determined, not by a man's capacity when starting fresh on a single day, but when starting on the last of several days after using up his reserves of strength by successive efforts above 21,000 feet; for the reserves are not made good by a night's rest at these great heights. There remained the problem of providing camps to allow the climbers to reach this theoretical limit, or the summit of Mount Everest if that proved to be the lower. It seemed likely that the limit in practice would be determined not by the endurance of the climbers, but by the capacity of the porters to carry loads above 23,000 feet, and by the organization of transport within their powers.

Considering this year's Expedition with reference to this problem, the climbing party was first concerned with the way up to the North Col. It was obvious to all of us, when we reached the Base Camp and could study the conditions of the mountain, that many of the slopes were icy, even on the north face. Strutt's party returning to the Base Camp on

May 8 gave a gloomy account in that respect. The almost level glacier was remarkably icy up to 20,500 feet. Somervell and I, when we went from the Base Camp on May 10, with orders to act independently and get as high as we could, fully expected prolonged step-cutting up to the North Col. On May 13 we set forth from Camp III. with one coolie. Of the slopes which Bullock and I had used in our ascent to the North Col last year, all except the final and steepest one were glittering ice. But we saw that by cutting up a short, steep slope at the bottom we could reach a gently sloping corridor, and so gain that final slope which was the key to the ascent. Choosing this way we found good snow almost continuously above the first ice. Thus we avoided, not only for that occasion but for the whole of the prolonged assault, a great labour and a great danger. It is essential to have a way up to the North Col where the coolies can very largely look after themselves, and, as it was, the labour of getting up on that first occasion proved quite sufficient.

On the North Col a quite unexpected difficulty arose. The final slope I spoke of gives out on to a wide snow shelf. Above it is an ice cliff, broken occasionally by deep fissures. Last year we had easily found a way round this obstacle in the direction of Mount Everest, and so reached the lowest point of the col. Somervell and I now found this way barred by an impassable crevasse. We stood at the edge of it for a little while, wondering whether it could really be true that we had come so far to be baulked by a crevasse, and debating the use of a ladder. Then we went back and explored in the direction of the North Peak. We found a steep way up at the further end of the ice cliff, and after leaping two large crevasses proceeded along the hummocky and broken ground beyond; at length we saw a clear way to the level snow from which the north ridge springs. But it does not follow that a party of the future will be so fortunate. One might well be cut off altogether in such a place, which evidently changes a good deal from year to year, and in a country where wood is difficult to obtain another expedition would do well to equip itself against this contingency.

On May 13, then, we had taken the first step towards establishing Camp IV. The one porter had carried up one tent. Nothing more could be done until more porters were available. Fortunately the transport arrangements below were now working so satisfactorily that on the 15th Strutt, Morshead, and Norton were able to join us at Camp III., and we were able to keep eight coolies from their convoy.

We had now to decide how best under these circumstances to tackle the problem, and principally whether we should attempt to make two camps or only one above Camp IV. at the North Col. The question, when we came to examine it in detail, was practically decided for us; with only nine, or possibly ten, coolies immediately available, the operation of providing a No. VI. Camp, involving nearly double the labour of providing only Nos. IV. and V., would take too long, besides in all

probability demanding too much of the porters. As it was we had a margin of strength—an invaluable margin. The plan allowed two coolies for each of four loads from Camp IV. to Camp V., and it was hoped that by this arrangement they would be able to reach 26,000 feet. The ten more loads were carried to Camp IV., under the North Col, on May 17.

On the 19th we left camp at 8.45 a.m., carrying up bedding and all warm things available for the porters. The day was fine and sunny. At 1 p.m. Norton and I were putting up tents, while Morshead and Somervell were fixing one more rope between the terrace of our camp and that of the col itself. These domesticities occupied the afternoon, and when sundown came at 4.30 we turned in for the night, all well and fairly comfortable, proudly possessing six thermos flasks.

Prospects seemed extraordinarily promising. It was our intention to carry on in the morning only four loads—two of the smallest tents, two double sleeping-sacks, food for one and a half days, cooking-pots, and two thermos flasks. Our nine porters, who were housed three apiece in Mummery tents, were perfectly fit, so that we had two porters for each load, even so having a margin of one porter. Everything had been managed so happily and satisfactorily that there was hardly a doubt that the men would be able to establish camp higher up the mountain on the morrow.

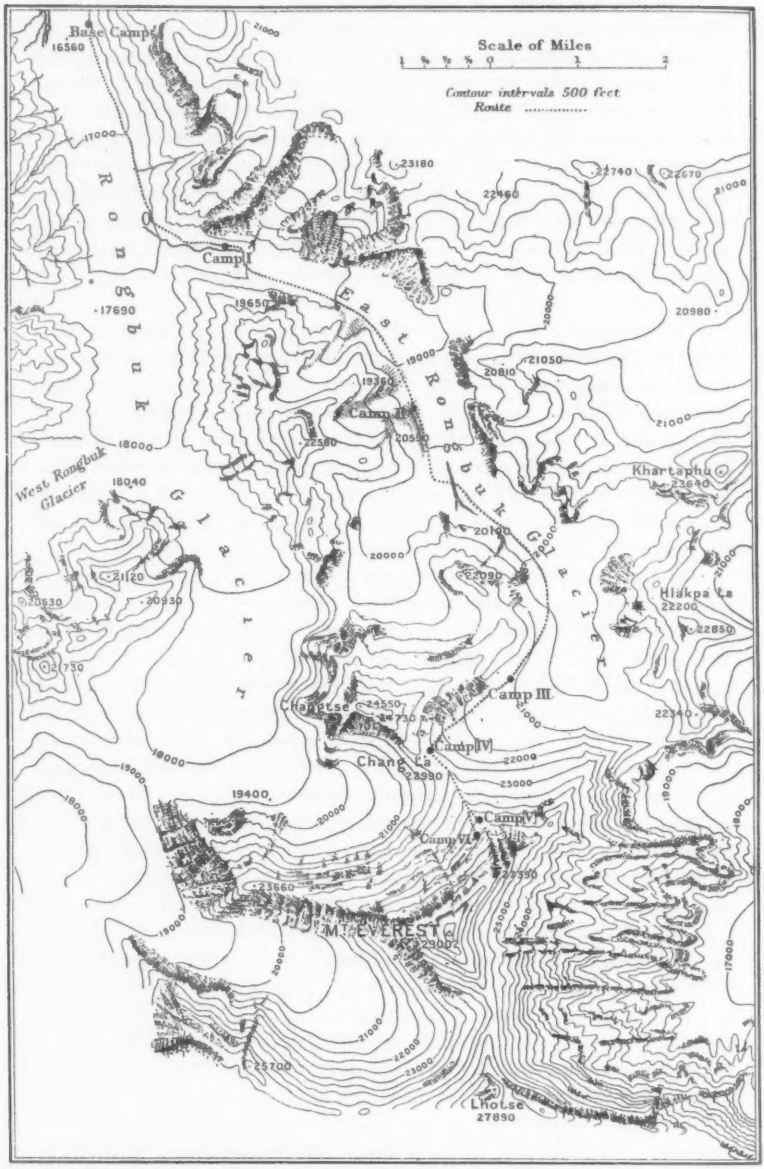
On May 20 sunlight hit the tents at 5 a.m. according to our time. I immediately got up to rouse the party. There was no sign of life in the porters' tents, which were hermetically sealed. Muffled responses from the interior carried no conviction of minds alert and eager. It was necessary to untie the elaborate fastenings by which the flaps were secured. The porters, I found, were all unwell—we eventually ascertained that four of them were seriously mountain sick. Five were willing to come on. It was hardly surprising that they felt better when they were persuaded to come out of the unventilated tents.

Further delays were caused by the cooking operations. It was easy to make tea with the water from our thermos flanks, but we had decided to start the day with a handsome dish of spaghetti. Unfortunately, the two tins provided for that purpose, instead of being gently nursed the night long near the warmth of human bodies, had been left out in the cold snow, and edible spaghetti was eventually produced only after prolonged thawing.

We started in the end an hour late, at 7 a.m., quickly making our way to the North Col, whence a broad snow ridge ascends at a gently increasing angle. It was clear that sooner or later steps would have to be chipped in the hard surface. We were able to avoid this labour at first by following the stone ridge on the west side.

Morshead, if good cheer be a sign of fitness, seemed the strongest and went first; we proceeded at a satisfactory pace in the fine early morning. Perhaps, after all, we should camp at the required height of 26,000 feet.

"Illusory hope of early sun begot!" We presently became aware



Sketch-map of Mount Everest and the Rongbuk glaciers, from surveys by Major Wheeler, with Route and Camps of the 1922 Expedition added by Colonel Strutt.

that it was not a perfect day: the sun had no real warmth, and a cold breeze sprang up from the west. I found myself kicking my toes against the rock for warmth whenever we paused, and was obliged to put on my spare warm clothes—a Shetland woolie and a silk shirt. The porters were evidently feeling the cold more acutely the higher they went. The ridge of stones ended abruptly, and it became clear that if we were to establish a camp at all, we must race for shelter to the east side of the ridge. Cutting steps at high altitudes is always hard work. The proper way to do it in hard snow is to give one blow with the ice-axe and then stamp the foot into the hole just made; but such a blow requires a man's full strength, and he must kick hard into the hole. On the higher Himalayas the amateur will probably prefer to make two or three chips of a feebler sort in cutting his steps. In any case, 300 feet of such work, particularly if hurried, is extremely exhausting, and we were glad to rest at length about noon, sheltered under rocks at about 25,000 feet.

There was no question now of getting our loads much higher before camping. The porters would have to return to camp; it would have been an unwarrantable risk to expose them further in such conditions; they must be sent down before they were frost-bitten and before the weather could change for the worse. Under other conditions it might have been necessary for some of us to accompany them on their way down; now they could safely be sent alone. No camping-place could be seen where we were, so we crossed round to the sheltered side, vaguely hoping that one might present itself. Eventually the porters with Somervell professed to have found the right place, and on the steep mountain side they proceeded to build a wall of stones so as to construct a comparatively flat place for one of the Mummery tents.

Norton and I, feebly imitating their efforts, proceeded to erect another, but somehow in our case the walls did not serve. One site after another proved a failure, until at last we found a steep slab of rock, which was at all events in itself secure, and so placed that it was possible to make up the ground at its lower end. Here we ultimately pitched our tent in such a way that the slab took up half the floor-space. A more uncomfortable arrangement could not have been devised, as the inevitable result was that one man slid down on to the other as they lay, squeezing them tightly together, and so increasing almost to the pitch of agony the pain caused by the sharp rocks forming the other part of the floor.

There, however, were the two little tents, perched fifty yards apart in some sort of fashion for security under the lee of rocks, containing each a double sleeping-bag for warmth in the night. Somervell melted snow with much labour for a perfunctory meal, and soon each bag harboured a pair of men, tightly packed, warming each other, and warmed by the prospect full of hope of a day's mountaineering unlike all others, because we were to start from a point on the Earth's surface higher than any before reached.

Perhaps none of us yet realized how much we had already suffered from the cold. Norton's ear was thrice its normal size, and proved a considerable inconvenience by limiting the number of admissible dispositions for his limbs and mine in those close quarters. Three of my fingers were frost-touched; but luckily the effects of frostbite are not very serious in the early stages. Far more serious was Morshead's condition. Too late in the day he had put on his sledging suit for protection against the wind; on arriving in camp he was chilled and evidently unwell. We had also to regret the loss of Norton's rucksack; it slipped from his knees during a halt, and must now lie somewhere at the head of the Rongbuk glacier with its provision of warm things for the night; however, we still had enough among us.

Our chief anxiety was the weather; the west wind dropped in the evening, and the signs pointed to a change. At intervals during the night we noticed that stars were visible; nearer dawn we were disgusted to observe that the ground outside was snow-white. A little later, listening, we heard fine hail falling on the tents, and peering out of the tent door it was possible to make out that the cloud and mist were coming up from the east on a monsoon current.

At 6.30 a.m., with somewhat better signs, we extricated ourselves from our sleeping-bags and set about preparing a meal. Only one thermos flask had turned up overnight, so that our task was cold and long. Another ill-fated ruck-sack containing provisions slipped from our perch, but miraculously, after bounding 100 feet or more, stopped on a small ledge. Morshead, heroically exerting himself, recovered it.

At about 8 o'clock we were ready to start. We did not discuss whether in these conditions we ought to proceed. The snow which had fallen was obviously an impediment, and more was to be expected. But weather of this sort, with all its disadvantages to the mountaineer, may not mean mischief. In high altitudes the snow falls fine, and is not hard driven by the wind. So far as getting up was concerned, there was therefore little fear on this count. None of us, after a long headachy night, felt at our best. For my part, I hoped that the mere effort at deep breathing in the first few steps of the ascent would string me up to the required efforts, and that we all should be better once we had started.

Disappointment followed at the moment of setting out in hearing bad news from Morshead.

"I think I won't come with you," he said; "I am quite sure I should only keep you back."

On such a question only the man concerned is able to judge. We three (Mallory, Somervell, and Norton) went on regretfully without him.

Details of the climbing of the next few hours do not merit exact description. The conditions were naturally unfavourable: fresh snow covered the ledges and concealed loose stones, everywhere obstructive; but the general nature of the ground was not difficult. Despite the

geological conjectures of last year, we did not find ourselves climbing chimneys and flakes. There was no sign of granite as we stepped up from ledge to ledge; and these ledges were uniformly tilted disadvantageously.

Plainly the rock is of a stratified sedimentary form, and as far as can be seen it must have the same general nature up to the summit, varied only by recognizable bands of lighter-coloured quartzite. It was a disappointment that the angle of the ledge was not sufficiently steep to require a more strenuous use of the arms, for the arms help one up, seeming to relieve the monotony of balanced footwork.

It was a matter of slowly pushing up, first regaining the ridge by striking westwards, then following the ridge itself directly towards the great tower capping the north-east shoulder of the mountain. Ultimately, the power of pushing up depended upon lung capacity. Lungs governed our speed, making the pace a miserable crawl. From the Alpine point of view our lungs made us pause to admire the view oftener than is correct in the best circles. But our lungs were remarkably alike and went well together. Personally I contrived a looseness of the muscles by making an easy, deep-drawn breath, and by exercising deep breathing I found myself able to proceed. For a long time we had good hope of reaching the north-east shoulder, but, remembering the long descent to be made and the retarding circumstances of fresh snow, we agreed to turn back not much later than 2 p.m.

We had to consider Morshead left behind at Camp V. On his account it was desirable to get back to camp with time in hand to reach the North Col on the same day; and in any case it would be an insane risk to climb to the utmost limit of one's strength on Mount Everest and trust to inspiration or brandy to get one down in safety; for the body does not recover strength in the descent as it does in the Alps.

At 2.15, some time after crossing the head of a conspicuous couloir on the north-east face, we reached, as it were, the head of the rocks, still perhaps 500 feet below the north-east shoulder of the mountain, and commanding a clear view to the summit. The pace of the party was extremely slow, and there was obvious risk in spending much more time in going up. Greatly as we desired to gain the shoulder—and we were not yet at the end of our powers—the only wisdom was in retreat. The aneroid registered 26,800 feet. We turned to descend with sufficient strength, we believed, for the long task before us.

Away to the westward the ground appeared to be less rocky, and to have more snow. Our obvious plan was to make use of any snow slope in that direction for our descent. We were, however, very quickly disillusioned, as the "snow slopes" turned out to be a series of slabs of rock lying treacherously under a fresh white mask of snow. We were obliged to get back to our ridge and follow down along our upward tracks. At 4 o'clock Morshead welcomed us back to our camp of the previous night at 25,000 feet. After gathering what we wanted and leaving our tentr,

sleeping-sacks, and other items, we proceeded back along the ledge which our track of yesterday had followed. It was difficult to realize immediately how the freshly fallen snow had made of this easy ground a dangerous passage. A nasty slip occurred, and three men were held only by the rope secured round the leader's single ice-axe. The party proceeded very cautiously after this incident, and it soon became evident that it would be a race with the oncoming darkness.

When we regained the great snow ridge, no traces of the steps we had cut on the upward journey could be found; we had to repeat the step-cutting. That grim and slow process was observed at about 6 o'clock by Strutt from below in Camp III. Nor were our difficulties at an end after the passage of this slope. One of the disagreeable facts which differentiates Himalayan expeditions from those in lower mountains is that an exhausted man does not recover his strength quickly as he goes down. Morshead, although climbing very pluckily, and making the most tremendous efforts to get his breath, had now arrived at the end of his tether. At best he could proceed only a few steps at a time. Fortunately, it was easy going on the way down to the North Col as we watched the diminishing light. Norton supported Morshead with his shoulder while I was finding the easiest way down, and Somervell acted as rear-guard. Lightning from blue-grey sinister clouds to the west began to flicker after sunset over one of the most amazing mountain views and one which seemed to be full of malice. What sort of wind were we going to find on the col after dark when our difficulties were due to begin once more?

Our luck was good, or Providence was kind, for, as soon as we had arrived at the starlit crevasses now dimly confronting us and Somervell had produced the lantern from his ruck-sack, so calm was the air that even with a Japanese match, after a dozen trials or so, we lit our candle. By its light we groped hither and thither to find our way; there were crevasses concealed beneath the trackless surfaces; happily no one fell through before we reached the edge of a little cliff. Here it was necessary to jump down about 15 feet into snow, a sufficiently alarming prospect with so dim a light to guide one; but the leap was safely accomplished. One of the fixed ropes, if only we could find it, would now take us down to the terrace where the five tents could just be seen still neatly pitched in a row awaiting our arrival. The rope had become buried by snow and our last candle burnt out. We groped for some time along the edge of the precipice and then began to go down at a steep angle, doubting whether this were the way. Suddenly some one hooked up the rope from under the snow. We knew then that we could reach the tents.

A little later, at 11.30, we were searching our camp for fuel and cooking-pots. None were found. A meal without liquid food was not to be contemplated; but the North Col, unless snow could be melted, was "dry." The best "ersatz," invented by Norton, was a mixture of

jam and snow with frozen condensed milk. The sickly stuff was most unlike a drink, and I ascribe to its influence the uncontrollable shudderings, spasms of muscular contraction in belly and back which I suffered in my sleeping-bag, and which caused me to sit up and inhale again great whiffs from the night air, as though that habit of deep breathing had settled upon me indispensably.

On the following morning, urged still by our unrelieved cravings, we set off at 6 a.m. I suppose a fresh man with tracks to help him might comfortably reach Camp III. in an hour from the North Col. It took us six hours, and we worked hard; we had to make a staircase beneath the new snow good enough for porters' use, for we did not intend to sleep at 21,000 feet without our sleeping-bags. And it is worth remarking that the circumstance of new snow and covered tracks must always be a serious consideration to a tired party on the Chang La.

In the light of these experiences we may review afresh the problem of climbing Mount Everest. By far the most important modification of our previous view is in respect of the porters. Their power was far greater than was to be expected. None before had ever carried a camp above 23,500 feet; these men carried our loads to 25,000; Finch's even higher to 25,500 feet, and some of them even repeated this amazing feat on three successive days. Nor is there the smallest reason to suppose that after sleeping a night above 25,000 feet they would be incapable of going on next day. They showed astonishingly little signs of fatigue. The mountain sickness to which some of them succumbed on the North Col was easily accounted for by the fact that they closed their tent doors and slept with too little air; nothing of the kind occurred again. The fact that the porters were capable of so much and endured so well has profoundly altered the aspect of our problem. It seems that almost certainly a sixth camp, at about 27,000 feet, might be carried up; and the limit of climbing, instead of being determined by the difficulty of fixing camps, will be determined simply by the factor of endurance among the trained climbers.

And what, after this year's performances, may be expected of them? It will have been observed that the three of us who reached 26,800 feet* climbed only 1800 feet in a day from our camp; but the maximum time was not available; bad weather delayed our start, and the descent was to camp below our starting-point. So far as time is concerned we should have had five hours more, and judging by the party's performance up to their highest point, I haven't the smallest doubt that with five hours more 700 feet might have been added to the record, and the day's performance brought to 2500 feet. The question, then, which I should put is this: Is it conceivable, in the first place, that in two days above the North Col a

* Since writing this we have the figures worked out by Morshead from theodolite observations at the Base Camp; according to them we reached 26,985; but we cannot deduce from this the exact rise on the final day, since Camp V. is unfixed by theodolite.

camp could be fixed at 27,000 feet? and, in the second, supposing a party to start from 27,000 feet, could they conceivably climb in a day the remaining 2000 feet to the summit? We cannot, of course, give a certain answer; but at all events the question does not appear fantastic. The effort of climbing the last 2000 feet to the summit should not in itself be considerably greater than that of climbing the 2000 feet from 25,000 to 27,000; for the difference in atmospheric pressure is very small, only 0·8 of an inch between 27,000 feet to the summit, compared with a difference of 19½ inches between sea-level and 27,000 feet. The factors which will tell against the climber on this last section are his efforts on the previous days, from which it may be supposed he will not have recovered completely, and, possibly, ill effects from sleeping at these very high camps. But if any gambler has been laying odds on the mountain, he should very considerably reduce his ratio as a result of this year's expedition.

I imagine that a number of physiologists, especially, would be inclined to reduce these odds on the mountain. I was told at Oxford last year, by Sir Walter Raleigh, that the physiologists said it was physiologically impossible to climb to the top of Mount Everest without oxygen—the matter had been proved by experiments in a pressure-reducing chamber. I told Sir Walter that the physiologists might explode themselves in their diabolical chamber, but we would do what we could to explode their damnable heresy—or words to that effect. I always, as a matter of course, take off my hat to scientists, as latter-day Olympians breathing a different if not purer air than common mortals. But the air of Mount Olympus (a base little lump after all) is not that of Mount Everest, and experiments made there with a pumped-out tank, interesting as they may be, are of no value in determining where precisely on that other hill of unrivalled altitude persevering man will be brought to a standstill; for it must be supposed of the persevering man that he has been acclimatized to rarefied air, while the Olympian and other victims of those experiments are only acclimatized to the atmosphere of Mount Olympus, which, I am given to understand, is particularly dense. Acclimatization—this is the factor at the root of the matter. The best experiment in this respect is to go to Mount Everest, or some other high mountain, and see how you feel; the scientists may explain your feelings, but when it comes to prophecy they have less right to be heard than a high-climbing mountaineer; the idea of the man who has tried as to how much higher he might go should be of incomparably more value than any conclusion proceeding merely from a laboratory. The best opinion on this question must surely be that of Somervell (may he forgive me for bringing his name into this controversial matter), who, besides climbing to 26,985 feet (accepting the theodolite figure as against the aneroid) without the aid of oxygen, has a trained knowledge of physiology. I think he will not disagree with any remarks of mine on this subject.

We have considered so far only the problem of climbing Mount Everest without oxygen. To climb the mountain with oxygen is a separate problem; here Finch is the authority, and it is not my province to discuss the details. It will be remembered that Somervell and I when we went up for the third attempt this year intended to use oxygen; judging from what had been said by Finch, Bruce, and others too who had used oxygen up to the North Col we imagined we should go further with than without it. It was this possibility that decided us during that long day of June 4 while we lay in the sangar at Camp I., watching the clouds and the snow, to push up again—to be repelled finally by some danger that we ought not to face or to be conquered by the difficulties. The problem of climbing Mount Everest with the aid of oxygen seemed not so very far beyond our powers, provided the fair opportunity, when we thought of what had been done already. Perhaps the most significant fact was this—that three of us after climbing to a height only about 2000 feet below the summit had felt no special distress.

Two other considerations must engage our attention, because they affect the problem of climbing Mount Everest: the dangers involved, and the weather. This year's expedition has emphasized the dangers. It has tragically pointed to the danger of an avalanche on the way up to the North Col—how grievous an accident it was can only be known to those who had tested those seven brave men, had contact with their gay indomitable spirits, seen their unflagging good humour, received tokens of their constant will to help, of their unfailing faithful hearts. An impartial judge may say that in the last analysis the accident was due to imperfect knowledge of snow in this part of the Himalayas; and with the comment that one never can know enough about snow, I should bow to that judgment. The lesson at all events will not be forgotten, and one may suppose that another party will not be caught in the same way.

About the other dangers it is necessary to say more, because they must vitally affect the organization of any attempt to climb the mountain. Every one will remember how Morshead's collapse compromised our plan of descent. There is, of course, no question of his determination; his companions have nothing but sympathy for him and praise for his splendid pluck. The causes of this collapse are obscure; his heart was not affected; possibly it was due to want of liquid food. At starting from the North Col Morshead seemed fitter than any one; his failure was a complete surprise to all of us; and in view of it I think a party of the future should reckon that some such experience may happen to any one of them. At a high altitude even the strongest might suffer this loss of muscular power; and *he will not recover up there.* The danger in such a case can hardly be over-estimated; all calculations of time will be upset, and the awful fate of a night out, perhaps above 27,000 feet, will be hanging over the party. The only valid precaution against such an

event is to have another party in reserve at the camp from which the first climbers have started.

Another danger, to which I referred last year, concerns the porters. It must be remembered that, though active men, they are not trained mountaineers. In favourable conditions they would probably climb down, say, from 26,000 feet without disaster. Even so, this practice is not to be commended; they are apt to straggle, and have no idea of looking after one another. And they are averse to using a rope. But on the crevassed North Col the rope must be used for safety; and conditions are not always favourable. As a general rule provision should be made to escort the porters, even when tracks are available. And this, again, points to a much larger personnel, capable of effective action at least up to 25,000 feet.

It may further be said, though it must be obvious to any mountaineer, that at high altitudes one climbs much nearer the margin of strength. There is singularly little reserve for an emergency, though I'm glad to say there was enough for emergencies in the case of the climb I have described. It is not too much to assert that all dangers through faults in climbing are immensely greater on Mount Everest than, for instance, on Mont Blanc or the Matterhorn.

Again, the sum of all these dangers is increased to an extent that cannot be over-emphasized by unfavourable weather. A party with one man *hors de combat*, a party who have passed that indefinite line beyond which mere weakness becomes a danger, a party of porters with no tracks to guide them and no compass lore, or finding fresh snow on the steep slope below the North Col; men in such circumstances are in gravest peril when the wind blows on Mount Everest. It is when we view our problem as a whole, in the light of the weather experienced this year, that we should be least inclined to optimism. Apart from any consideration of the monsoon's date, and that of 1922 was admittedly early, the conditions before it came were not encouraging. The weather had a bad habit; it presented us with a dilemma; either we might have a taste of the monsoon and the threat of snow in the air—it will be remembered that snow fell while we were encamped at 25,000 feet—or we should have that bitter enemy, the north-west wind, the wind that drove us to camp a thousand feet lower than we intended, the wind that Finch and Bruce will not forget for its howling during the first night at their high camp.

Perhaps it is not impossible for men to reach the summit of Mount Everest, in spite of wind and weather; but unless the weather can mend the habit we observed this year, or grant a long respite, their chances of reaching it and getting down in safety are all too small. Man may calculate how to solve his problem, and . . . you may finish the sentence.

THE SECOND HIGH CLIMB

Captain George I. Finch

THE climbing of Mount Everest is a tremendous proposition. With a clear realization of this, I joined the expedition, ready to do my share in the conquest of the mountain by every means at our disposal. Optimism may be the attribute of fools; but they say that experience teaches even such, and my experience of Alpine climbing had already taught me that no stiff mountaineering problem can be tackled with much hope of success unless one believes wholeheartedly in the possibility of achievement. I think it was Sir Francis Younghusband who, somewhere or other, referred to the necessity of possessing the faith that removes mountains, and a purpose unhoneycombed with half-heartedness. With such an example in our minds throughout that long and, at times, rather trying journey across Tibet, where it was, perhaps, hard to keep one's optimism always unsullied, it was not impossible for one to cling to the watchword "Everest is climbable, and we shall climb it." Confidence alone were of little avail; but allied with enthusiasm and respect for the work in hand it engenders that concentration of mind and energy which acts like a searchlight upon the problem, and seeks solutions for the complicated questions of equipment, tactics, and so forth, involved.

A little over a year ago I had considered, somewhat carelessly and superficially I fear, the advantages of using oxygen as an aid to climbing Mount Everest, and had dismissed the idea on the grounds that the weight of any useful supply would be prohibitive. Prof. Dreyer, however, the Professor of Pathology in the University of Oxford, held the strong opinion that Mount Everest would never be climbed without oxygen, and that an ample supply could be provided in a sufficiently portable form to enable the summit to be reached. The question was examined by the Mount Everest Committee with an open mind, with the result that his opinion was endorsed, and it was decided to include oxygen in the equipment of the expedition. The oxygen equipment, consisting of very light steel cylinders for storing the oxygen and an ingenious apparatus for distributing it to the climber, was evolved by Major Stewart and Mr. Eager of the Air Ministry, and Mr. Unna, in close co-operation with Mr. Davis and Mr. Rosling of the firm of Siebe Gorman & Co. It was somewhat complicated, but frequent oxygen drill parades were taken very seriously by all members of the party.

There are those who do not believe in oxygen. Perhaps it is because simple obvious facts render them uneasy in their unbelief, that they rush into print with a wholesale condemnation on the grounds that its use in high mountaineering is what they rather loosely term "artificial," and therefore unsporting. Now, few of us, I think, who stop to ponder for a brief second, will deny that our very existence in this enlightened

twentieth century with all its amenities of modern civilization is, in the same slipshod sense of the word, "artificial." Most of us have learnt to respect progress and to appreciate the meaning and advantages of adaptability. For instance, it is a fairly firmly established fact that warmth is necessary to life. The mountaineer, acting on this knowledge, conserves as far as possible his animal heat by wearing specially warm clothing. No one demurs; it is the common-sense thing to do. He pours his hot tea from a thermos bottle—and never blushes! Nonchalantly, without fear of adverse criticism, he doctors up his inside with special heat- and energy-giving foods and stimulants! From the sun's ultra-violet rays and the wind's bitter cold, he boldly dares to protect his eyes with Crookes' anti-glare glasses; further, he wears boots that to the average layman look ridiculous! The use of caffeine to supply just a little more buck to an almost worn-out human frame is not cavilled at despite its being a synthetic drug the manufacture of which involves the employment of complicated plant and methods. If science could prepare oxygen in tabloid form or supply it to us in thermos flasks that we might imbibe it like our hot tea, the stigma of "artificiality" would, perhaps, be effectually removed. But when it has to be carried in special containers, its whole essence is held to be altered, and by using it the mountaineer is taking a sneaking, unfair advantage of the mountain! In answer to this grave charge, I would remind the accuser that, by the inhalation of a little life-giving gas, the climber does not smooth away the rough rocks of the mountain or still the storm; nor is he an Aladdin who, by a rub on a magic ring, is wafted by invisible agents to his goal. Oxygen renders available more of his store of energy and so hastens his steps, but it does not, alas! fit the wings of Mercury on his feet. The logic of the anti-oxygenist is surely faulty.

I have seen the opinion expressed—presumably by way of supporting the idea of attempting to climb Mount Everest inadequately equipped, *i.e.* without oxygen—that it is just as important to ascertain how far a man can climb without oxygen as to reach the top by what are called "illegitimate" means. It may be important, but it was not the object which the expedition had to attain.

General Bruce had brought us safely, both mentally and physically, through Tibet to the Base Camp. Put baldly thus, it may sound a small accomplishment; actually, the task was one demanding the highest qualities of generalship and powers of organization. When we left him at the Base, his great fund of energy and cheerful good wishes for success continued to encourage us.

On May 20 Geoffrey Bruce and I arrived at Camp III. We were accompanied by Tejbir, one of the four Gurkha non-commissioned officers on the expedition and as fine a type of Gurkha humanity as one could wish to see. The cylinders containing our oxygen were found to be in good condition; but the apparatus—through no fault of the

makers, who had, indeed, done their work admirably—leaked very badly, and to get them into satisfactory working order, four days of hard toil with soldering iron, hacksaw, pliers, and all the other paraphernalia of a fitter's shop were necessary. Our workshop was in the open. The temperature played up and down round about 0° F., but inclined more to the negative side of that irrational scale. Even handling bits of metal in the bitter cold, often with bare hands on account of the delicate nature of some of the repairs, did not prevent Geoffrey Bruce from helping me with that energy, great will, and good nature that he showed so abundantly throughout the whole of our climb together. The masks from which the oxygen was to be breathed proved useless, but by tackling the problem with a little thought and much cheerfulness a satisfactory substitute was eventually evolved. Preparatory to embarking on the climb itself, we went for several trial walks—one over to the Rapiu La, a pass 21,000 feet high, at the foot of the north-east ridge of Everest, from which we hoped to obtain views of the country to the south. But only part of the north-east ridge showed hazily through drifting mists. Towards the north and looking down the East Rongbuk glacier, views were clearer, though partially obscured by rolling banks of cloud. Colonel Strutt and Dr. Wakefield, unoxygenated, accompanied us on this little expedition, and oxygen at once proved its value, so easily did Bruce and I outpace them. On our return to Camp III., the delicate white mists floating in the sky above the North Col seemed to beckon to us to climb these snowy slopes and see what lay hid in the back of beyond. So two mornings later we started off for the North Col on another trial trip. In the afternoon we returned to Camp III. There had been a considerable amount of step-cutting, for fresh snow had fallen, compelling us to deviate from the usual route; but even so oxygen had made a brief Alpine ascent of what is otherwise a strenuous day's work. We took 3 hours up and 50 minutes down, with 36 photographs taken *en route*.

On May 24, Captain Noel, Tejbir, Geoffrey Bruce, and I, all using oxygen, went up to the North Col (23,000 feet). Bent on a determined attack, we camped there for the night. Morning broke fine and clear though somewhat windy, and at 8 o'clock we sent off up the long snow slopes leading towards the north-east shoulder of Mount Everest, twelve porters carrying oxygen cylinders, provisions for one day, and camping gear. An hour and a half later, Bruce, Tejbir, and I followed, and, in spite of the fact that each bore a load of over 30 lbs., which was much more than the average weight carried by the porters, we overtook them at a height of about 24,500 feet. They greeted our arrival with their usual cheery, broad grins. But no longer did they regard oxygen as a foolish man's whim; one and all appreciated the advantages of what they naïvely chose to call "English air." Leaving them to follow, we went on, hoping to pitch our camp somewhere above 26,000 feet. But shortly after 1 o'clock the wind freshened up rather offensively, and it began to

snow. Our altitude was 25,500 feet, some 500 feet below where we had hoped to camp, but we looked round immediately for a suitable camping site, as the porters had to return to the North Col that day, and persistence in proceeding further would have run them unjustifiably into danger. This I would under no circumstances do, for I felt responsible for these cheerful, smiling, willing men who looked up to their leader and placed in him the complete trust of little children. As it was, the margin of safety secured by pitching camp where we did instead of at a higher elevation was none too wide; for before the last porter had departed downwards the weather had become very threatening. A cheerful spot in which to find space to pitch a tent it was not; but though I climbed a couple of hundred feet or so further up the ridge, nothing more suitable was to be found. Remembering that a wind is felt more severely on the windward side of a ridge than on the crest, a possible position to the west of the ridge was negatived in favour of one on the very backbone. The leeside was bare of any possible camping-place within reasonable distance. Our porters arrived at 2 p.m., and at once all began to level off the little platform where the tent was soon pitched, on the very edge of the tremendous precipices falling away to the East Rongbuk and Main Rongbuk glaciers, over 4000 feet below. Within twenty minutes the porters were scurrying back down the broken rocky ridge towards the snow slopes leading to the North Col, singing as they went snatches of their native hillside ditties. What splendid men! Having seen the last man safely off, I looked to the security of the guy-ropes holding down the tent, and then joined Bruce and Tejbir inside. It was snowing hard. Tiny, minute spicules driven by the wind penetrated everywhere. It was bitterly cold, so we crawled into our sleeping-bags, and, gathering round us all available clothing, huddled up together as snugly as was possible. With the help of solidified spirit we melted snow and cooked a warm meal, which imparted some small measure of comfort to our chilled bodies. A really hot drink was not procurable, for the simple reason that at such an altitude water boils at so low a temperature that one can immerse the hand in it without fear of being scalded. Over a *post prandium* cigarette, Bruce and I discussed our prospects of success. Knowing that no man can put forward his best effort unless his confidence is an established fact, the trend of my contribution to the conversation was chiefly, "Of course, we shall get to the top." After sunset the storm rose to a gale, a term I use deliberately. Terrific gusts tore at our tent with such ferocity that the ground sheet with its human burden was frequently lifted up off the ground. On these occasions our combined efforts were needed to keep the tent down and prevent its being blown away. Although we had blocked up the few very small openings in the tent to the best of our powers, long before midnight we were all thickly covered in a fine frozen spindrift that somehow or other was blown in upon us, insinuating its way into sleeping-bags and clothing, there to cause acute discomfort. Sleep

Phot. by Capt. J. B. Noel

1. LOOKING UP THE EAST RONGBUK GLACIER FROM ABOVE CAMP II

Phot. by T. H. Somervell

2. MALLORY AND NORTON APPROACHING THEIR HIGHEST POINT (26,985 FEET)

Phot. by T. H. Somervell

3. THE WAY TO THE SUMMIT FROM THE HIGHEST POINT OF THE FIRST CLIMB

Phot. by Capt. G. I. Finch

4. A FROST-BITTEN CLIMBER HELPED DOWN THROUGH THE SERACS TO CAMP II

4. A FROST-BITTEN CLIMBER HELPED DOWN THROUGH THE SERACS TO CAMP II

Phot. by Capt. G. I. Finch

5. THE OXYGEN PARTY AT THE CHANG LA CAMP

6. CHANGTSE FROM THE CAMP ON THE CHANG LA

Phot. by Capt. J. B. Noel

Cho Uyo Gyachung Kang

7.

7. LOOKING NORTH FROM 24,500 FEET ON THE NORTHERN RIDGE OF MOUNT EVEREST

Phot. by Capt. G. I. Finch

Morshead Mallory Somervell Norton

Phot. by Capt. J. B. Noel

9. THE FIRST CLIMBING PARTY

8. THE EXPEDITION AT THE BASE CAMP

Geoffrey Bruce Finch

Phot. by Capt. J. B. Noel

10. THE BRITISH MEMBERS OF THE SECOND CLIMBING PARTY

Phot. by Capt. J. B. Noel

8. THE EXPEDITION AT THE BASE CAMP

Geoffrey Bruce Finch

Phot. by Capt. J. B. Noel

10. THE BRITISH MEMBERS OF THE SECOND CLIMBING PARTY

Tejbir

Phot. by Capt. G. I. Finch

11. TEJBIR THE GURKHA N.C.O. OF THE SECOND CLIMBING PARTY

Phot. by Capt. J. B. Noel

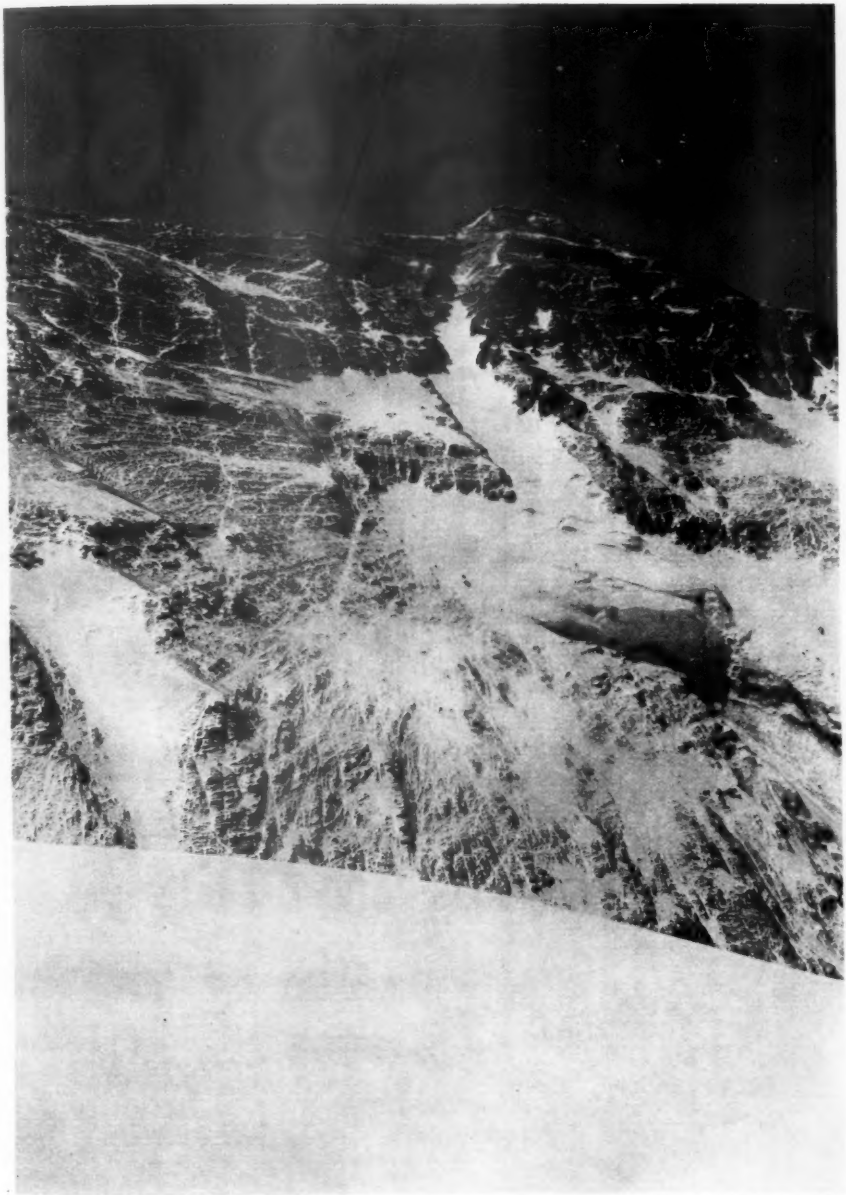
12. THE AVALANCHE TRACK OF JUNE 7, BELOW THE CHANG LA

Phot. by Capt. J. B. Noel

13. PARTY RESTING DURING THE ASCENT OF THE CHANG LA

Phot. by Capt. G. I. Finch

14. THE NORTH FACE OF SUMMIT OF MOUNT EVEREST FROM THE CHANG LA



Phot. by Capt. G. I. Finch

15. THE NORTHERN RIDGE OF MOUNT EVEREST FROM CHANG LA

Phot. by Capt. G. I. Finch

16. LOOKING WEST OVER PUMORI FROM 200 YARDS NORTH AND 100 FEET ABOVE THE CHANG LA

was out of the question. We dared not relax our vigilance, for ever and again all our strength was needed to hold the tent down and to keep the flaps of the door, stripped of their fastenings by a gust that had caught us unawares, from being torn open. We fought for our lives, realizing that once the wind got our little shelter into its ruthless grip it must inevitably be hurled with us inside it down on to the East Rongbuk glacier, thousands of feet below.

And what of my companions in the tent? To me who had certainly passed his novitiate in the hardships of mountaineering, the situation was more than alarming. About Tejbir I had no concern; he placed complete confidence in his sahibs, and the ready grin never left his face. But it was Bruce's first experience of mountaineering, and how the ordeal would affect him I did not know. I might have spared myself all anxiety. Throughout the whole adventure he bore himself in a manner that would have done credit to the finest of veteran mountaineers, and returned my confidence with a cheerfulness that rang too true to be counterfeit. By one o'clock on the morning of the 26th the gale reached its maximum. The wild flapping of the canvas made a noise like that of machine-gun fire. So deafening was it that we could scarcely hear each other speak. Later, there came interludes of comparative lull, succeeded by bursts of storm more furious than ever. During such lulls we took it in turn to go outside to tighten up slackened guy-ropes, and also succeeded in tying down the tent more firmly with our Alpine rope. It was impossible to work in the open for more than three or four minutes at a stretch, so profound was the exhaustion induced by this brief exposure to the fierce cold wind. But with the Alpine rope taking some of the strain we enjoyed a sense of security which, though probably only illusory, allowed us all a few sorely needed moments of rest.

Dawn broke bleak and chill; the snow had ceased to fall, but the wind continued with unabated violence. Once more we had to take it in turns to venture without and tighten up the guy-ropes, and to try to build on the windward side of the tent a small wall of stones as an additional protection. The extreme exhaustion and the chill produced in the body as a result of each of these little excursions were sufficient to indicate that, until the gale had spent itself, there could be no hope of either advance or retreat. As the weary morning hours dragged on, we believed we could detect a slackening off in the storm. And I was thankful, for I was beginning quietly to wonder how much longer human beings could stand the strain. We prepared another meal. The dancing flames of the spirit stove caused me anxiety bordering on anguish lest the tent, a frail shelter between life and death, should catch fire. At noon the storm once more regained its strength and rose to unsurpassed fury. A great hole was cut by a stone in one side of the tent, and our situation thus unexpectedly became more desperate than ever. But Tejbir still smiled, and Bruce's cheerfulness was not found wanting; so we carried

16. LOOKING WEST OVER PUMORI FROM 200 YARDS NORTH AND 100 FEET ABOVE

on, making the best of our predicament until, at 1 o'clock, the wind dropped suddenly from a blustering gale to nothing more than a stiff breeze. Now was the opportunity for retreat to the safety of the North Col camp. But I wanted to hang on and try our climb on the following day. Very cautiously and tentatively I broached my wish to Bruce, fearful lest the trying experience of the last twenty-four hours had undermined his keenness for further adventure. Once again I might have spared myself all anxiety. He jumped at the idea, and when our new plans were communicated to Tejbir, the only effect upon him was to broaden his already expansive grin.

It was a merry little party that gathered round to a scanty evening meal cooked with the last of our fuel. The meal was meagre for the simple reason that we had catered for only one day's short rations, and we were now very much on starvation diet. We had hardly settled down for another night when, about 6 p.m., voices were heard outside. Our unexpected visitors were porters who, anxious as to our safety, had left the North Col that afternoon when the storm subsided. With them they brought thermos flasks of hot beef-tea and tea provided by the thoughtful Noel. Having accepted these most gratefully, we sent the porters back without loss of time.

That night began critically. We were exhausted by our previous experiences and through lack of sufficient food. Tejbir's grin had lost some of its expanse. On the face of Geoffrey Bruce, courageously cheerful as ever, was a strained, drawn expression that I did not like. Provoked, perhaps, by my labours outside the tent, a dead, numbing cold was creeping up my limbs—a thing I had only once before felt, and to the seriousness of which I was fully alive. Something had to be done. Like an inspiration came the thought of trying the effect of oxygen. We hauled an apparatus and cylinders into the tent, and, giving it the air of a joke, we took doses all round. Tejbir took his medicine reluctantly, but with relief I saw his face brighten up. The effect on Bruce was visible in his rapid change of expression. A few minutes after the first breath, I felt the tingling sensation of returning life and warmth to my limbs. We connected up the apparatus in such a way that we could breathe a small quantity of oxygen throughout the night. The result was marvellous. We slept well and warmly. Whenever the tube delivering the gas fell out of Bruce's mouth as he slept, I could see him stir uneasily in the eerie greenish light of the moon as it filtered through the canvas. Then half unconsciously replacing the tube, he would fall once more into a peaceful slumber.

Before daybreak we were up, feeling fresh and fit, though terribly hungry. We proceeded to make ready for our climb. Putting on our boots was a struggle. Mine I had taken to bed with me, and a quarter of an hour's striving and tugging sufficed to get them on. But Bruce's and Tejbir's were frozen solid, and it took them the best part of an hour

to mould them into shape by holding them over lighted candles. Shortly after six we assembled outside. Some little delay was incurred in arranging the rope and our loads, but at length at 6.30 a.m., soon after the first rays of the sun struck the tent, we shouldered our bundles and set off. What with cameras, thermos bottles, and oxygen apparatus, Bruce and I each carried well over 40 lbs.; Tejbir with two extra cylinders of oxygen shouldered a burden of about 50 lbs. Our scheme of attack was to take Tejbir with us as far as the north-east shoulder, there to relieve him of his load and send him back. The weather was clear. The only clouds seemed so far off as to presage no evil, and the breeze, though intensely cold, was bearable. But it soon freshened up, and before we had gone more than a few hundred feet the cold began to have its effect on Tejbir's sturdy constitution, and he showed signs of wavering. Bruce's eloquent flow of Gurumuki, however, managed to boost him up to an altitude of 26,000 feet. There he collapsed entirely, sinking face downwards on to the rocks and crushing beneath him the delicate instruments of his oxygen apparatus. I stormed at him for thus maltreating it, while Bruce exhorted him for the honour of his regiment to struggle on; but it was all in vain. Tejbir had done his best; and he has every right to be proud of the fact that he has climbed to a far greater height than any other native. We pulled him off his apparatus and, relieving him of some cylinders, cheered him up sufficiently to start him with enough oxygen on his way back to the high camp, there to await our return. We had no compunction about letting him go alone, for the ground was easy and he could not lose his way, the tent being in full view below.

After seeing him safely off and making good progress, we loaded up Tejbir's cylinders, and, in view of the easy nature of the climbing, mutually agreed to dispense with the rope, and thus enable ourselves to proceed more rapidly. Climbing not very steep and quite easy rocks, and passing two almost level places affording ample room for some future high camp, we gained an altitude of 26,500 feet. By this time, however, the wind, which had been steadily rising, had acquired such force that I considered it necessary to leave the ridge and continue our ascent by traversing out across the great northern face of Mount Everest, hoping by so doing to find more shelter from the icy blasts. It was not easy to come to this decision, because I saw that between us and the shoulder the climbing was all plain sailing and presented no outstanding difficulty. Leaving the ridge, we began to work out into the face. For the first few yards the going was sufficiently straightforward, but presently the general angle became much steeper, and our trials were accentuated by the fact that the stratification of the rocks was such that they shelved outward and downward, making the securing of adequate footholds difficult. We did not rope, however. I knew that the longer we remained unroped, the more time we should save—a consideration of vital importance. But as I led out over these steeply sloping, evilly smooth slabs, I carefully

watched Bruce to see how he would tackle the formidable task with which he was confronted on this his first mountaineering expedition. He did his work splendidly and followed steadily and confidently, as if he were quite an old hand at the game. Sometimes the slabs gave place to snow —treacherous, powdery stuff, with a thin, hard, deceptive crust that gave the appearance of compactness. Little reliance could be placed upon it, and it had to be treated with great care. And sometimes we found ourselves crossing steep slopes of scree that yielded and shifted downwards with every tread. Very occasionally in the midst of our exacting work we were forced to indulge in a brief rest in order to replace an empty cylinder of oxygen by a full one. The empty ones were thrown away, and as each bumped its way over the precipice and the good steel clanged like a church bell at each impact, we laughed aloud at the thought that "There goes another 5 lbs. off our backs." Since leaving the ridge we had not made much height although we seemed to be getting so near our goal. Now and then we consulted the aneroid barometer and its readings encouraged us on. 27,000 feet; then we gave up traversing and began to climb diagonally upwards towards a point on the lofty north-east ridge, midway between the shoulder and the summit. Soon afterwards an accident put Bruce's oxygen apparatus out of action. He was some 20 feet below me, but struggled gallantly upwards as I went to meet him, and, after connecting him on to my apparatus and so renewing his supply of oxygen, we soon traced the trouble and effected a satisfactory repair. The barometer here recorded a height of 27,300 feet. The highest mountain visible was Cho Uyo, which is just short of 27,000 feet. We were well above it, and could look across it into the dense clouds beyond. The great west peak of Mount Everest, one of the most beautiful sights to be seen from down in the Rongbuk valley, was hidden, but we knew that our standpoint was nearly 2000 feet above it. Everest itself was the only mountain-top which we could see without turning our gaze downwards. We could look across into clouds which lay at some undefined distance behind the north-east shoulder, a clear indication that we were only a little, if any, below its level. Pumori, an imposing ice-bound pyramid, 23,000 feet high, I sought at first in vain. So far were we above it that it had sunk into an insignificant little ice hump by the side of the Rongbuk glacier. Most of the other landmarks were blotted out by masses of ominous yellow-hued clouds swept from the west in the wake of an angry storm-wind. The point we reached is unmistakable even from afar. We were standing on a little rocky ledge, just inside an inverted V of snow, immediately below the great belt of reddish-yellow rock which cleaves its way almost horizontally through the otherwise greenish-black slabs of the mountain. Though 1700 feet below, we were well within half a mile of the summit, so close indeed that we could distinguish individual stones on a little patch of scree lying just underneath the highest point.

Ours were truly the tortures of Tantalus; for, weak from hunger and exhausted by that nightmare struggle for life in our high camp, we were in no fit condition to proceed. Indeed, I knew that if we were to persist in climbing on, even if only for another 500 feet, we should not both get back alive. The decision to retreat once taken, no time was lost, and, fearing lest another accidental interruption in the oxygen supply might lead to a slip on the part of either of us, we roped together. It was midday. At first we returned in our tracks, but later found better going by aiming to strike the ridge between the north-east shoulder and the North Col at a point above where we had left it in the morning. Progress was more rapid, though great caution was still necessary. Shortly after 2 p.m., we struck the ridge and there reduced our burdens to a minimum by dumping four oxygen cylinders. The place will be easily recognized by future explorers; those four cylinders are perched against a rock at the head of the one and only large snow-filled couloir running right up from the head of the East Rongbuk glacier to the ridge. The clear weather was gone. We plunged down the easy broken rocks through thick mists driven past us from the west by a violent wind. For one small mercy we were thankful—no snow fell. We reached our high camp in barely half an hour, and such are the vagaries of Mount Everest's moods that in this short time the wind had practically dropped. Tejbir lay snugly wrapped up in all three sleeping-bags, sleeping the deep sleep of exhaustion. Hearing the voices of the porters on their way up to bring down our kit, we woke him up, telling him to await their arrival and to go down with them. Bruce and I then proceeded on our way, met the ascending porters and passed on, greatly cheered by their bright welcomes and encouraging smiles. But the long descent, coming as it did on the top of a hard day's work, soon began to find out our weakness. We were deplorably tired, and could no longer move ahead with our accustomed vigour. Knees did not always bend and unbend as required. At times they gave way altogether and forced us, staggering, to sit down. But eventually we reached the broken snows of the North Col, and arrived in camp there at 4 p.m. A craving for food, to the lack of which our weakness was mainly due, was all that animated us. Hot tea and a tin of spaghetti were soon forthcoming, and even this little nourishment refreshed us and renewed our strength to such an extent that three-quarters of an hour later we were ready to set off for Camp III. An invaluable addition to our little party was Captain Noel, the indefatigable photographer of the expedition, who had already spent four days and three nights on the North Col. He formed our rearguard and nursed us safely down the steep snow and ice slopes on to the almost level basin of the glacier below. Before 5.30 p.m., only forty minutes after leaving the col, we reached Camp III. Since midday, from our highest point we had descended over 6000 feet; but we were quite finished.

That evening we dined well. Four whole quails truffled in *pâté-de-foie gras*, followed by nine sausages, left me asking for more. The last I remember of that long day was going to sleep, warm in the depths of our wonderful sleeping-bag, with the remains of a tin of toffee tucked away in the crook of my elbow.

Next morning showed that Bruce's feet were sorely frostbitten. I had practically escaped ; but the cold had penetrated the half-inch-thick soles of my boots and three pairs of heavy woollen socks, and four small patches of frostbite hampered me at first in my efforts to walk. Bruce was piled on to a sledge, and I journeyed with him as his fellow-passenger. Willing porters dragged us down until the surface of the glacier became so rough as to impose too great a strain on our slender conveyance with its double burden.

Our attack upon Mount Everest had failed. The great mountain with its formidable array of defensive weapons had won; but if the body had suffered, the spirit was still whole. Reaching a point whence we obtained our last close view of the great unconquered Goddess Mother of the Snows, Geoffrey Bruce bade his somewhat irreverent adieux with "Just you wait, old thing, you'll be for it soon!"—words that still are expressive of my own sentiments.

THE MOUNT EVEREST PHOTOGRAPHS

THE photogravures from this year's photographs published in the October *Journal* were concerned mainly, though not entirely, with the journey from Darjeeling to the Base in the Rongbuk valley below the snout of the main glacier. In this number, which contains the account of the two record-breaking high climbs, we publish a second series illustrating more particularly the alpine climbing and the personnel of the expedition.

Plate 1 shows the east Rongbuk glacier above Camp II., looking up to the south-east. Last year the climbing party came over the Lhakpa La at 22,500 feet, lying somewhere behind the hill in the centre of the picture, and crossed the smooth upper glacier to the Chang La. The route was not difficult, and the Kharta valley was a much more favourable camping-ground than the Rongbuk. But there was always the danger of a 22,500-foot pass in the line of communication and retreat; whence the preference this year for the East Rongbuk route, despite the frightful séracs and the great medial trench described by Colonel Strutt, and very well shown in this picture. The route lies along the foot of the moraine slope to a point near the right-hand edge of the picture, and then strikes out through the séracs to the centre.

Plates 2 and 3 are enlarged from two V.P.K. negatives made by Mr. Somervell. They are taken much higher than any photographs were ever before made on the Earth's surface, and they are the only photographs

made above about 24,000 feet on this year's expedition. We understand that Mr. Somervell exposed several other films at Camp V., and spoiled them in development. Captain Finch found it impossible to give any attention to photography in the upper stages of his climb, though he took some excellent pictures from about 24,000 feet, reproduced later. Mr. Somervell's pair taken close to 27,000 feet are therefore of particular interest and importance. They show that the way to the summit is rough and dangerous from the unfavourable disposition of slabs lightly covered with snow; but there are no serious climbing difficulties except possibly on the 500 feet below the summit. The point reached by Finch and Geoffrey Bruce is included in Plate 3, a little above the centre of the picture and a little to the right of what appears to be the summit, though the true summit lies a little further back.

Plates 4 and 5 were taken by Captain Finch. The first shows a frostbitten climber from the second high climb being helped down through the séracs; the second an oxygen party resting at Camp IV. on the ice-ledge below the Chang La. The fantastic surroundings of this camp are admirably seen in Plate 6, looking north over Camp IV. to the Changtse. Mr. Mallory's account relates how on the first climb the party were stopped at once by a crevasse, and had to retrace their steps some distance northward before they could find a way on to the col. The track is dimly shown in the shadow above the tents, leading up towards the precipitous western edge of the col.

Plate 7 is made by joining two photographs taken by Captain Finch from about 24,500 feet on the northern arête. On the left one looks down to the head of the main Rongbuk glacier and across the West Rongbuk towards Gyachung Kang and Cho Uyo. Pumori on the left is hidden in clouds which conceal also the solution to the still undetermined problem: Where is the head of the West Rongbuk glacier, and where does the watershed lie? Evidently two important branches of the glacier descend from the Cho Uyo group; but the topography here is still unknown, and the principal head of the glacier may yet be found to lie close to the Khombu La. The long ridge of Changtse in the centre of this plate looks more precipitous than it really is, because the camera was tilted downwards to show the glaciers. And over the ridge we can see the "light rock peak" of Kellas which remains unnamed, and all the range of peaks lying east of the East Rongbuk.

Plates 8, 9, 10, and 11 show the two climbing parties, Lance-Naik Tejbir belonging to the second. The figure in the long picture of the whole party, above Finch and between Geoffrey Bruce and Somervell, is Mr. John Macdonald, son of the British trade-agent at Gyantse, who had come up with a consignment of money and remained some weeks with the party.

Plate 12 shows, a little to the right of the centre, the track of the avalanche that overwhelmed the third attempt, with the ice-cliff over which

the porters were carried. Plates 14 and 15, from photographs by Captain Finch, have been marked to show the approximate sites of Camps V. and VI. and the higher points of the two high climbs. The pictures overlap, but are tilted rather differently and cannot be joined accurately. It has therefore seemed best to reproduce them separately. They give a striking representation of the bare and unattractive northern face before the monsoon snow has whitened it.

The last picture, No. 16, is geographically important, since it shows clearly for the first time the glacier running down into Nepal from the ice-col at the head of the main Rongbuk. This glacier comes out of the western cwm, and Mallory looked down it in 1921, but bad weather made his photograph rather unsuccessful. We see here that the watershed runs over this col and over Pumori. What happens to it later will not be known until a third expedition is able to devote a little time and energy to geography.

GEOLOGICAL NOTES FROM THE OXFORD EXPEDITION TO SPITSBERGEN

N. E. Odell

(*Contributed to the discussion following Mr. Frazer's paper, p.* 335.)

THE dominant character of the mountains around Klaas Billen Bay is their terraced structure due to the horizontally bedded Carboniferous rocks and the varying hardness of their component zones. These zones include limestones, chertz series, gypsiferous series, and kulm sandstones. Pronounced block-movements have given rise to plateaux, valleys, and fiords. The Carboniferous rocks rest unconformably on a complex base of granites and gneisses with, possibly, metamorphosed sediments. This complex comes to the surface only on the north side of the Nordenskiöld Glacier and in the base of Mount Terrier, where its vertical foliation and strike are well exposed. The main point of interest about this occurrence in Mount Terrier is the nature of the unconformity between the Carboniferous series and the basement complex. It consists of a great plain sloping slightly westwards, and it would appear to be part of a great "base-level" plain, such as that of Cretaceous age traced by Baron De Geer over the greater part of Spitsbergen. I found sandstone beds, but no conglomerate, resting directly on this plain along the whole south face of Mount Terrier, and from this and other considerations it would appear that it forms part of a great eroded surface of Middle-Carboniferous age. Looking east from the high interior of "Garwood Land," the flat-topped ranges to the north of Mount Svanberg at once suggest themselves as the continuation of this great plain of erosion.

To the north-east of Mount Terrier the granites and gneisses only protrude through the ice-sheet at rare intervals, but large exposures were found by the Russians in the Chydenius range to the north, though never in immediate contact with any sediments. One of the problems of Spitsbergen is the age of this complex, which by most geologists has been regarded as Archæan. This view has been generally accepted. But in 1909 the Norwegian geologists Olaf Holtedahl and A. Hoel found that in certain parts of north-west Spitsbergen what appears to be part of the same complex of granites and gneisses is intrusive into the so-called Hekla Hook sediments, which are themselves probably of Lower Palæozoic age. These Hekla Hook sediments take their name from a headland in the north-east of Central Spitsbergen, where they are well exposed. They consist mainly of a large series of dolomites with an important zone of quartzites and shales. They are entirely absent in the Klaas Billen Bay neighbourhood, having been eroded from the surface of the basement complex before the deposition of the Carboniferous rocks. We first encountered this Hekla Hook series in the neighbourhood of the Oxford Glacier in roughly the position assumed for it by Baron De Geer of Stockholm in his and Nathorst's geological map of Spitsbergen.

The difficulties we have had in piecing together the topographical features of our map with those but roughly represented on the Russian map, equally apply to the geological features. Helge Backlund of the Russian Arc of Meridian Party mapped various outcrops around the great *vallée blanche* immediately to the south of Mount Newton referred to in the paper. The Newton and Chernyshev massif was found to be composed of granites and other allied rocks, while the south bank of the *vallée blanche* was of Hekla Hook sediments; further down the *vallée* to the north-east the outcrops on either side were of Triassic sediments. To the west of the main massif crystalline schists were found. It was particularly unfortunate that none of these exposures were found in contact with each other so as to give some clue to their relative age, every junction being masked by glacier.

Two interesting points arise from these findings. First, if as we now suppose this *vallée blanche* be the main ice-stream that we looked up in a north-westerly direction from Water Camp, and the Oxford Glacier be merely a tributary of it, the *westward* dip of Backlund's Hekla Hook outcrop is difficult to reconcile with the prevailing *eastward* dip of these sediments in the closely adjoining neighbourhood of the Oxford Glacier, unless his exposure near the *vallée blanche* is merely a case of local rolling. That the latter is the case is suggested by our observing eastward-dipping masses along the scarp to the north-west of the Dry Camp Hill in a position that must be in close proximity to the *vallée blanche* and Backlund's westward-dipping Hekla Hook strata.

The second point arises from the presence of Triassic rocks striking in a direction transverse to the *vallée blanche*, that should bring them

into the neighbourhood of the Oxford Glacier. But we found no Triassic rocks at all, all exposures visited on either side of our glacier being of Hekla Hook dolomitic limestone. On the summit of Lion Nunatak, our furthest point reached, I found some conglomerate, and I am inclined to think that this marks the top of the Hekla Hook sediments. It was the greatest misfortune that time and the exigencies of the topographical survey on the Svarttoppen range quite prevented our crossing the several miles of glacier to the nearest rock outcrop in determination of this point. The indication of a junction with Carboniferous rocks in this particular area, as shown on De Geer's map, seems to be incompatible with the Triassic outcrops as mapped by Backlund. Any possible junction with the Carboniferous, if and where it exists in these parts, must lie considerably further east or north-east than is shown on the map: we had not crossed it at our furthest point east. However this may be, from the evidence we collected it is possible, I think, to push the upper junction of the Hekla Hook sediments considerably east of the position surmised for it on De Geer's and Nathorst's map.

Owing to the non-fossiliferous character of these Hekla Hook rocks there have been many theories as to their age. Prof. Holtedahl of Christiania has shown that a similar series of dolomites in Bear Island are of Ordovician age. The correlation of these with the Spitsbergen Hekla Hook rocks is a problem that I have high hopes may be brought some way towards solution by the specimens we secured, which are now being worked out. It is hoped, also, that a contribution may be made towards the other great problem of the date of the fundamental complex of the so-called Archæan. One cannot help feeling that the key to these problems lies in this region, where the Hekla Hook formation is so much less disturbed than in western Spitsbergen. Another small sledging party could in one season fill in many blank spaces on both the topographical and geological maps of eastern Spitsbergen.

THE HEART OF ARABIA

The Heart of Arabia.— **H. St. J. B. Philby.** London: Constable. 1922. 2 vols. *Maps and Illustrations.* 63*s. net.*

MEMBERS of the Royal Geographical Society do not need assurance that the Founder's Medallist of 1920 has written a book of the first importance: and they will assume that it deals with the remarkable journeys whose course he sketched at two Evening Meetings—the first crossing of the Peninsula of Arabia from the Gulf to Hejaz accomplished by a European for just a century; and a pioneer expedition into the southern provinces of habitable Nejd, which brought Mr. Philby—the first Christian—to Dam, capital of the long-hidden and much-discussed Wadi Dawasir. This book,

however, contains also the first narrative which Mr. Philby has published of his ride into the Shamiyah Desert on a political mission to the Bedouins of the Dhafir, Shammar, and Amarat tribes—a ride which would have been reckoned remarkable enough if undertaken before the war, and if conducted by any one else than Mr. Philby. Unhappily he has not seen his way to include his experiences in Kasim during the course of Ibn Saud's campaign against Ibn Rashid in the autumn of 1918. One may guess that silence has been imposed by superior authority in view of difficulties still unresolved between Ibn Saud on the one hand and King Husein and the Rashid dynasty on the other. Mr. Philby has put into two finely illustrated and printed volumes a straightforward account of all he did, saw, and heard. Equipped with unusual command of the Arab vernacular, and favoured and protected beyond any Christian who has visited Central Arabia, Mr. Philby has learned more about the country and its people at first hand than any predecessor. His curiosity about all around him seems to have been of the liveliest and the boldest: his persistence in questioning and drawing out his Wahabite companions is worthy of all imitation (but followers had better assure themselves first that they start with anything like his knowledge of Arab ways, as well as with some other exceptional assets); and his thought for the interests of all sorts of sciences is what is expected of a Medallist. Anthropologists and archæologists, as well as geographers, philologists, ethnologists, and political historians, will have to refer to his book. We have met with no volumes so packed with trustworthy information since Doughty.

The first stage of the trans-Peninsular ride—from the Gulf to Riadh—covered more or less known and rather dreary ground, and Mr. Philby's description of it has more human than geographical interest; but even here he adds notably to what we knew of Hasa and its waters, correcting or giving precision to the statements of his predecessors. Of Riadh he publishes the first really reliable plan, correcting Leachman's description; and, even if his enthusiasm for the architectural features of the palace may be discounted, he succeeds in convincing us that the Wahabite capital is a much less primitive place than has been supposed. A palace which boasts an arc-light and a bazaar where field-glasses may be bought by whoever can afford a pair, are well up in the Arab social scale. Mr. Philby's estimate of the urban population is also higher than the previously accepted figures. When he has got through the Saqta gorge into Dhruma he is on new ground, and he continues upon it for hundreds of miles to Taif. In this stage he makes his greatest contribution to geographical knowledge; for his discovery of the highlands west of Tuwaiq, and their division of the centre of the Peninsula into north-eastward and south-eastward slopes, is of first-rate importance structurally and hydrographically, altering our whole conception of the great lines of relief. And it stands by no means alone to Mr. Philby's credit. What he has found out about the structure and direction of Tuwaiq, and the sources, courses, and destination of the great Asir wadis is hardly less important. On his further way from Taif to Jidda he had the opportunity to see (or at least he has taken occasion to record) much more than his predecessors of the wadi-lands of Hejaz. He anticipated what Lawrence repeated on Feisal's authority about Wadi Aqiq, and gives such a description, supported by photographs, of Wadi Laimun and the middle valley of Wadi Fatima, as will open the eyes of those who had judged Hejaz by other accounts. It is interesting that he should have chanced on surviving Lahiyan tribesmen, now rude highlanders in the same district in which the Prophet found and smote them. Altogether

Mr. Philby writes very suggestively on the theme of the wilder Hejaz Bedouins, and one can only hope his desire to revisit them may be gratified.

If the geographical results of the second journey are of less magnitude, its social interest is the greater; for it led Mr. Philby through regions not only less known but much better peopled. It is true that he did not enter the chief settlements of South Nejd, Hilla, Hariq, and Hauta; but he looked over their forbidden valleys from afar, and picked up much information about them. Nor did he enter the Great South Desert; but one of his companions, who claimed to have crossed it thrice, told him tales which fired his ambition to cross it some day himself. He did traverse Kharj, Aflaj, Sulaiyil, and practically the whole habitable length of Wadi Dawasir, obtaining negative and positive results, which are equally valuable. On the one hand he dispels a whole cloud of myth about the populousness, the fertility, and the primæval barbarism of these districts; on the other, he furnishes first-hand data about their water supplies, both ancient and modern; he gives us a better account of both their actual social state and their recent history than we possess for almost any central Arabian oasis; and, in the process, he explains how things physical and social have come about—a peculiarly valuable boon, which no traveller equipped with less than Mr. Philby's wide knowledge could have conferred. The human interest of this journey, due largely to its revelation of the personalities alike of the author and of the Wahabite types with which he had to deal, makes it the most enthralling section of the book. Once more may hope be expressed that Mr. Philby has not gone into South Nejd for the last time as well as the first? If he cannot get across the Ruba el-Khali, he might try to our great advantage to find passage either to the heads of the Asir wadis, or to Nejran and the Jauf of Yemen.

In the course of this last part of his narrative he takes the opportunity of his visit to Aflaj not only to repeat what he has said in public about Gifford Palgrave's claim to have preceded him there, but also to develop the general attack on that traveller's *bona fides*, of which he gave notice some time ago. Certain passages in other parts of his book are not very consistent with this larger accusation, and betray some hesitancy—for example, he mentions Palgrave in connection with a view from north of Riadh, as if the latter, though he misrepresented it in his narrative, had seen it with his eyes; but none the less, explicitly as well as implicitly, Mr. Philby does now accuse Palgrave of having represented falsely that he visited Riadh and Hasa, and indeed Kasim, or, it seems, any point south of Hail. Owing to the lapse of seventy years since Palgrave's journey, it is probably impossible now to find any one in Arabia who could vouch for or deny with authority his passage at any given point, although not so long ago his Syrian companion still survived as bishop of Zahleh in the Lebanon; and he may still be alive. Therefore judgment must go by Palgrave's own account of his doings; and each judge will pronounce according to the view that subjectively he takes of the proportion which things proved right in that narrative bear to things proved wrong. It is not enough to insist, as does Mr. Philby, merely on Palgrave's sins of commission and omission. Against these must be tabulated the residuum of information either probably correct for the date in question, or as correct as could reasonably be expected of an unprotected, ill-equipped traveller, not concerned primarily with observation, who could make few written notes on the spot for fear of his life, and (to credit his own statement) lost those few before he came to write his narrative. Now, if Mr. Philby will read his own book over again, he will come across a good many references

to Palgrave which imply that he found much which falls into that residuum. For instance, he acknowledges Palgrave's plan of Riadh to be better than Leachman's, though the latter traveller undoubtedly was there under much more favourable auspices for observation than the former; and he notes that not only this plan but also that given by Palgrave of Hofuf in Hasa contains "much excellent internal detail." Does he really maintain that those two plans were based on the talk of, or rude sketches by, Wahabite merchants in Hail? or that from the same source Palgrave compiled a romance of his stay in Riadh, which, as a picture of Wahabite society and the leading Wahabites of that day, strikes one as portraiture, and has not since been impugned? For myself, after reading the forty pages of Mr. Philby's criticism, I find nothing in Palgrave's account of his journey and stay in Nejd and Hasa, including even his expedition to Aflaj (this last, as Mr. Philby justly says, is a trifle in the larger question), which cannot be accounted for by the known idiosyncrasy, and the commonly accepted subsequent circumstances of this particular traveller, after he had in fact visited what he says he visited. I do not hold, and have never held, a brief for Palgrave's accuracy. He was a romantic unconscionable *poseur*, who, if he did not remember clearly, sometimes invented and usually exaggerated. But I find it incredible that he should have carried invention so far as to concoct the whole story of his journey south from Hail. Mr. Philby must suggest some adequate motive for such colossal mendacity as well as take into account and explain the evidence for Palgrave's vision, as well as that for his blindness, before he returns to the attack. It is so easy not to see most conspicuous and important things just off one's path, and even easier, when one comes to describe, to mistake times, places, views, impressions, one superimposed on another in a traveller's unassisted memory. That Palgrave's narrative is full of gross errors and fantasy does not need proof; that it is pure invention almost from end to end cannot be proved, and the attempt to do so meets with the fate of attempts to prove too much.

D. G. H.

REVIEWS

EUROPE

The Provinces of Ireland.— Leinster, pp. 256; Munster, pp. 176; Connaught, pp. 172; Ulster, pp. 186. Edited by **G. Fletcher.** Cambridge: University Press. 1921 and 1922. *Maps and Illustrations.* 6*s.* 6*d.* each (Leinster, 7*s.* 6*d.*).

THESE four volumes form a series of admirable handbooks of Ireland. A volume on Ireland as a whole is promised in the near future. Each volume is the work of a number of authorities, and consists of articles on the physical geography, geology, botany, zoology, antiquities, architecture, administration, industries, and manufactures. Climate and races receive very brief notice, but possibly these are left for the more general volume. Among the authors are Professors R. A. S. Macalister, G. A. J. Cole, I. Swain, Mr. R. Lloyd Praeger, Mr. E. C. R. Armstrong, and the Editor. Each volume has a coloured orographical map of the province, which leaves some room for improvement, and a useful coloured geological map of the whole of Ireland. In size, illustrations, and fullness of content these volumes deserve nothing but praise, and fill a want in giving accurate, non-partisan information about Ireland. They are much more complete and comprehensive than the volumes for the counties of England issued by the same publishing house, and—a

matter of no small importance—they are provided with full indices. In one respect they merit criticism. The joint authorship of each volume has resulted in a lack of correlation between the various aspects of each province. The geographical outlook to a great extent is missing. It is however only fair to say that they do not claim to be geographies, but herein lies a possible line of improvement. We would like also to see a chapter on the distribution of population. R. N. R. B.

Regional Geography of Europe.— N. E. Macmunn and G. Coster. Oxford: University Press. 1922. Pp. viii. + 343. *Many Diagrams.* 4*s.* 6*d.*

This book was planned by Prof. Herbertson "for the upper forms in Schools and for Technical Colleges"; and, besides the general outline—which omitted the British Isles, but included the whole Mediterranean basin—he left the introductory chapter complete and the second (Eastern Lowlands) in skeleton. The filling up has been done by Miss Coster and Miss Macmunn, except for a short appendix on Political Divisions and Peoples by Mr. O. J. R. Howarth.

Fairly large claims are made by the authors on the second page of the Preface, but only one of them is fully justified—in an admirable series of climatic data. Least justified is the claim to have dealt "logically and fully' with towns, and to "have mentioned no town without a clear indication of the geographical reasons for its position and importance."

At the same time, there is a great deal of sound and valuable work in the book, though in many places the treatment is so full that not much is left to the teacher. Indeed, the book will be most useful to students who are working by themselves, for the treatment is truly and suggestively regional, even carrying subdivision sometimes almost to straw-splitting. The text is also illustrated by many bold and easily understood diagrams; most of them are really educational, but some are unilluminating, *e.g.* on pages 56 and 101, and one or two are even misleading, *e.g.* on page 96.

All the sections on reliefs and climate are most carefully and accurately worked out, and some of the treatment is very stimulating; but, especially on the economic side, the book is in some respects inaccurate and out of date. For instance, the statement (p. 61) that the Balkan peninsula—defined as "south of the Kulpa-Save-Danube line"—has about the same area as the British Isles is obviously incorrect. Prof. Herbertson's Handbook, vol. 1, p. 439, which takes the same limit, puts the area at "175,000 square miles, excluding the islands."

The worst mistake of the kind, however, occurs in the chapter on France. The whole book leads up to this chapter, which occupies 48 out of 323 pages; so there is an opportunity, fully used, for bringing together much of the valuable work done by French geographers on their Home-land. This makes the chapter of special value, particularly to students working by themselves; but it imposes an obligation on the authors to have this final and culminating chapter as accurate and up-to-date as possible. Now, the paragraph (p. 318) on the chief ports is both inadequate and misleading. It says that Marseille is the first port and Le Havre the second; and in a separate paragraph Rouen is referred to as "the lowest bridge-town on the Seine, which makes it an important route centre; but its wealth comes from its great cotton and linen manufactures." That is all! But, as far back as 1913, Rouen was the second port, and by 1920 it was the first. Last year certainly it only passed Marseille by about 7000 tons, but it did pass it; and the returns for the first half of 1922 show that its tonnage was almost equal to that of Marseille and Le

Havre combined. Nor is a word said about Paris as a port, though it was far above Marseille in tonnage even as far back as 1913; and Prof. Demangeon's excellent article on the port (cf. *Journal*, vol. 57, p. 392) was published in November 1920. Of course Paris is only a local port, and the prosperity of Rouen may not be firmly established as yet; but a "logical and full" treatment of the town would have at least explained why it is now the chief port, and likely to remain so. L. W. L.

ASIA

The Mineral Resources of Burma.— **N. M. Penzer**, with an Introduction by **Colonel O. C. Armstrong**. London: George Routledge & Sons, Ltd. 1922. Pp. viii. + 176. *Price* 31*s.* 6*d.*

Burma has come into prominence in recent years as a rich mineral province, and a great deal of information, statistical and descriptive, has been published on its mineral resources and their development, especially by the Geological Survey of India. Mr. Penzer in this book has brought together as much information as he has been able to collect from all sources on minerals in Burma. Such a work is almost invariably useful, and there must be many readers who will find this compilation a great saving of time and trouble.

An introductory chapter deals briefly with geographical and physical features, history, roads and railways, and weights and measures. The second chapter gives an account of the geology of Burma and the Shan States, based on the official gazetteer of the region. The remaining chapters are devoted chiefly to minerals in the following order: gems and precious stones; silver, lead, and zinc; tin and tungsten; iron, coal, and lignite; salt; miscellaneous minerals; petroleum. A Burmese glossary is included, and the last chapter consists of a fairly exhaustive bibliography.

Mr. Penzer's treatment of the subject, however, leaves much to be desired. He tells us in the chapter on tin and tungsten that "as there are so few mines in Burma which have mining plant of any considerable size, it is of interest to give details whenever possible," and he proceeds to give details of the Kanbank mining plant, but supplies no adequate description of the mining plant of the Bawdwin mines concerning which so much information has been published in recent years. Again, Columbite is said to occur in the Tavoy tungsten lodes, although the officers of the Geological Survey of India, whose observations extended over several years, failed to find any. Indeed, lack of up-to-date information is a serious defect throughout the book as regards statistics and technical details.

Misprints mar the pages in many places, but are not perhaps likely to give much trouble to one who knows his minerals, and is acquainted with mining terms. Far more exasperating, however, is the bad arrangement of the headings and subdivisions in the text, which spoils many parts of the book, but which is perhaps seen at its worst in the chapter on miscellaneous minerals.

The author will deserve the gratitude of readers of future editions if he will eradicate these and other defects, and bring the book up to date. T. C.

AFRICA

The Canary Islands: their History, Natural History and Scenery.— **David A. Bannerman, M.B.E., B.A. (Cantab.), M.B.O.U., F.R.G.S., etc.** London and Edinburgh: Gurney & Jackson. 1922. Pp. xv. + 365. With *Illustrations and Maps. Price* 30*s. net.*

The author of this book is a well-known ornithologist, whose work at the British Museum has been broadened by a long series of judicious and valuable

studies of bird-life in foreign lands. It was, therefore, as an ornithologist, in the first place, that he was led to explore "The Fortunate Islands"; but birds do not live to themselves alone, and he was soon convinced that a proper understanding of the problems which presented themselves could be reached only through a knowledge of the geological history, physical peculiarities, and vegetation of the islands. The results of his own observations in these fields and of those of earlier investigators are presented in this volume, which, bearing the marks of first-hand study and wide reading, forms a general and balanced guide to the islands themselves, and an enlightening study on the development of an island fauna.

The more serious theme of the book is preceded by an historical survey dealing with the discovery and early records of the islands, and approving Major's conclusion that before the coming of the Spaniards they were peopled by two distinct races, Berbers and Arabs; but the archipelago contains much unexamined authropological material of early date which may yield a rich harvest to skilled examination.

The physical features of the islands are well known, and have been moulded upon a foundation of sedimentary rocks, by lavas resulting from a succession of four great periods of volcanic activity, the last of which has occurred within the memory of man; but the origin of the archipelago, a matter of prime importance in tracing the foundation of the fauna, has been the subject of much discussion. Since Plato first propounded the former existence of an Atlantis, now sunk beneath the waves, the legend that the isolated dots of the Canaries, Azores, Madeiras, and Cape Verde group were the peaks of the sunken continent has had many believers, the latest being the French geologist Termier, who in 1912 suggested that the submergence probably dated from early Pliocene or Miocene times. But the weight of the geological evidence points rather to a volcanic origin, and Mr. Bannerman's investigation of the affinities of the fauna and flora strongly supports this conclusion.

Thus although twelve genera of plants have distinct American affinities at the present day, they belong to groups widely distributed in the Old World in former times, and the mass of the endemic vegetation, some 333 plants out of a rich island flora of about 1250 species, are clearly of Mediterranean origin, while the origin of the bulk of the remainder may be set down to the transporting power of oceanic currents or migratory birds. And so with the bird-life. For the birds of the islands, numbering 61 resident species, and excluding the 156 species of the migrants which can shed no direct light on the origin of the islands, have distinctly defined Mediterranean affinities, the majority having their closest relatives in Southern Europe, and the minority in Northern Africa. The suggestion is that the Canaries were stocked from the adjacent continents, and the migratory birds of to-day point to the mode of arrival of the original stock. The absence of indigenous mammals, apart from the flying bats, is also a strong argument against the presence of a continental bridge in post-Miocene times.

But the birds reveal still more of the islands' history; for of the 61 resident species no less than 42 are species or racial forms peculiar to the Canaries, while 10 more are not found without the ambit of the Atlantic islands. This surely points to a far distant colonization, since which the forces of nature have gradually driven one isolated form after another along paths divergent from those of their continental ancestors. Even more significant of the opportunity given by isolation for individual development are those interesting cases

of four or five distinct varieties (as in the Canarian Titmice and Chaffinches) almost each of which is confined to its own little island.

In the course of his wanderings and investigation of the luxuriant vegetation, the author came upon many traces of the influence of man upon topography and fauna through his destruction of the woodland. The great forests of laurel, chestnut, and pine, which in the beginning of the nineteenth century clothed the hillsides of Gran Canaria in a "beauty that appeared fabulous" to the early travellers, have been destroyed by the inhabitants for fire and charcoal-making. And with the destruction of the woods the numbers of many of the birds have diminished, and some, such as Bolle's Pigeon, have become extinct. Others are on the verge of extinction, and the author makes a strong appeal to the sportsman and bird-collector to spare the waning elements of an unique island fauna. J. R.

Historical Atlas of South Africa.— Eric A. Walker. Humphrey Milford (Oxford University Press). 1922. Pp. 26 and 26 *Maps*. *Price* 10*s*. 6*d*. *net*.

Mr. Walker, Professor of History in the University of Cape Town, has done a very useful piece of work in producing this atlas—history at a glance, on a sound geographical basis. Besides those of South Africa, maps are given illustrating the connection of the Cape with Europe, the East Indies, and other places, from the fifteenth century onward; also a map showing the partition of Africa south of the Congo. The value of the atlas is much enhanced by the letterpress, which gives explanatory notes on each map, quotes original authorities freely, and shows that Mr. Walker has thoroughly mastered his subject. The system of colouring and of marking boundary-lines adopted is bold and effective; only one map (No. 16), that to illustrate the Griqualand West dispute, have we found difficult to "read." Here the letterpress helps without making that very tangled story perfectly clear. (The Platberg line can, however, be found marked on Map 14.) Of special interest are the maps illustrating the growth of Cape Colony; they embody the result of much research, and make accessible information hitherto hard to come by.

In the partition map (No. 24) the frontier shown between Nyasaland and German territory differs from that shown in the map (23*b*) of German East Africa, and both maps are incorrect on this point. It is a small matter, but meticulous accuracy is desirable in an historical atlas. The Anglo-German frontier was the middle of Lake Nyasa, and not either the eastern or western shore. F. R. C.

Impressions et Observations dans un Voyage à Tenerife.— Jean Mascart. Paris: Ernest Flammarion. [N.D.] Pp. 366. 212 *Illustrations*. 5 *frs*.

The author of this volume has made a valuable contribution to the literature on the island of Tenerife, more particularly as the principal subjects with which he deals have not previously received much attention.

Monsieur Jean Mascart—then astronomer at the Paris Observatory, and now Director of the Lyons Observatory—was a member of the scientific mission organized by Prof. Pannwitz with the double object (1) of studying the influence of the climate on the human body under certain conditions; and (2) of taking meteorological and astronomical observations and photographing Halley's Comet.

Tenerife was chosen for the experiments in preference to other high stations by reason of the exceptional climatic conditions which that island enjoys during the greater part of the year. A clear atmosphere, sun, and altitude being the principal factors necessary for success, the expedition built a wooden

house on the summit of Guajara, the highest crater of the Cañadas (8897 feet), on the very site upon which Piazzi Smith carried out his astronomical experiments in 1858.

In a short review it is impossible to do more than briefly summarize the matter which the book contains. It is divided into two parts: in the first the author tells of the life led by the members of the expedition in the Cañadas, describes an ascent of the peak, and discourses at some length on the observations they were able to make on Halley's Comet during its appearance in April and May 1910. Then follows an account of the author's visit to the new crater formed in the eruption of November 1909, and a brief description of the island, its vegetation, climate, soil, inhabitants, and principal industries.

Part II. deals mainly with various physiological, astronomical, and meteorological observations. The results of the first-named should prove of considerable value to the medical profession. M. Mascart's impressions of the principal towns and villages which he visited—Santa Cruz, Laguna, Tacoronte, Orotava, La Rambla de Castro, and Vilaflor—and his brief reference to the conquest and to the early inhabitants will appeal to those readers whose interests are not purely scientific. The author draws attention (p. 181) to a valuable manuscript account of the conquest of the Canaries which exists at the present day at Rouen. He is of opinion that if it is not the original script of Bethencourt's historians—Pierre Bontier and Jean le Verrier—it is a copy written at the same period, for the writing is that of the fifteenth century. This manuscript merits further attention.

While each section of the book is clearly set out, the general arrangement or grouping of the subjects does not strike the reviewer as particularly happy: the sections dealing with Halley's Comet, for instance, would better have followed one another in sequence, instead of appearing in Part I. and again in the Notes at the end of the book; likewise the section dealing with Volcanoes (pp. 251 *et seq.*) would have been more appropriately placed in Part I. following the physical description of the island.

The 212 illustrations are mainly from photographs of scenes in Tenerife and of Halley's Comet. The former are mostly excellent—particularly those of the Cañadas—but others are not so well chosen and could have been omitted. A Bibliography of various works—mainly physiological and astronomical—is given. There is no index, and but a poor map (given as frontispiece), which is however better than none at all. D. A. B.

On the Trail of the Pigmies.— **Dr. Leonard John Vanden Bergh.** London: T. Fisher Unwin. 1922. Pp. xxiv. and 264. *Illustrations and Sketch-map.* 12*s.* 6*d. net.*

We have in this volume an account of half a dozen tribes living in British East Africa, and of the Mambute pigmies as seen in the Kilo district of Belgian Congo). The author was for ten years a missionary of the Roman Catholic Church in Buganda and Kavirondo; he revisited East Africa in 1919–20 with the specific object of making ethnological investigations and procuring cinema films. He writes specially for the American public, and a good deal of what he tells them is already known to British ethnologists. Father Vanden Bergh is however a competent observer, if not a trained anthropologist, and recent first-hand information about conditions among even such well-known people as the Masai is of value. The word of praise given in the preface of this work by Mr. R. H. Lowie, of the American Museum of Natural History, is well earned. Father Vanden Bergh is to be congratulated on the persistence with which he kept to his trail until he found the pigmies. Though

the Mambute are not so unknown as he appears to have imagined, we are glad to have this very sensible and well-informed account of them. Few observers have obtained such good photographs of the little folk.

The author writes in lively style, with free use of Americanisms ; there are indications that he could write better if he chose. Some of his spellings of place-names are peculiar, *e.g.* Rajaff, Kyoga, Butyaba. Sir Charles Eliot's name is persistently misspelt. The book has no index. F. R. C.

AMERICA

The Cowboy : his Characteristics, his Equipment, and his Part in the Development of the West.— P. A. Rollins. New York : Charles Scribner's Sons. 1922. Pp. x. + 253. $2.50.

The picturesqueness of the American stockman and the fascination which the freedom of frontier life suggests have resulted in a melodramatic representation of the cowboy which in many respects is far from the truth. This parody of the cowboy has disappeared from boys' story-books, with the virtual extinction of the redskin, only to be revived for the cinematograph show. The swashbucklering cowboy has reappeared on the films. Mr. Rollins spent many years in the cattle-lands of the West, and writes with intimate knowledge of its inhabitants. He succeeds in this well-written, informative book in showing that the cowboy was far more than a theatrical character. He was a constructive factor in the social and political development of the United States. The Cattle Range or Cattle Country, as the grazing area of the West was called, found its earliest white inhabitants in the ranchers and cowboys from Texan and other Mexican ranches. But the lure of the country soon drew men from the Eastern States and the British Isles. All classes were to be found in the circle of the cowboys. The universities of the Atlantic coast and of Great Britain had "a representation which was strong numerically, if a bit weak academically." From about 1875 to 1885 the occupation was at its height : then it began to languish. The advance of the farmer, displacing the ranchman, and, with wire fences restricting his movements, the decline in value of the horse and the advent of the railway—all led to the same end, and there was no place for the cowboy : he migrated to new lands in Mexico or South America, or found more or less sedentary vocation. The nomad, as on all the grass-lands of the world which are fit for cultivation, had to restrict his nomadism and give way to the settled peasant. Mr. Rollins hopes that his book will supply a chapter in the history of the western United States by showing how these virile men of high courage and brave achievement, of childlike simplicity and of broad tolerance, though perhaps also of violent prejudice, helped to build a nation and lay the foundations of a real democracy free from the abstract formulas of the east. In this he has succeeded, but his book is also a valuable contribution to geography in the close connection which it emphasizes between people and the land they lived in. The volume deserves to be read attentively by any student of the geography or history of North America.

R. N. R. B.

Down the Columbia.— L. R. Freeman. London : W. Heinemann. 1922. Pp. xxvi. + 384. *Illustrations.* 25*s. net.*

Mr. Freeman claims to be the first man to have navigated the Columbia river all the way from its glacial sources to the tide water, although several other voyagers have rounded the big northern bend. The numerous rapids on the river make this task difficult, and in places dangerous ; a spill would probably prove fatal. The voyage did not begin at the source of the Columbia above

Lake Windermere but at Golden, where the main line of the Canadian Pacific railway meets the river, the distance from Windermere to Golden being covered in train. Mr. Freeman's companions were a photographer on the search for cinematograph pictures, and several experienced boatmen. Without the latter the feat would have been impossible. The story is well told with many flashes of humour, and the book, though rather lengthy, is never tedious. The writer claims that his camera rather than his pen will convey something of the grandeur of the mountain and forest scenery through which he passed, but in truth neither is successful in this respect. The reader's interest is concentrated on the river the whole way, and the thrills of the rapids are too exciting to let attention wander. There is one small black and white map, which is inadequate for following the narrative. R. N. R. B.

Grønland i Tohundredaaret for Hans Egedes Landing.— Under Redaktion af **G. C. Amdrup, Louis Bobé, Ad. S. Jensen. H. P. Steensby.** (*Meddelelser om Grønland*, Bind **60** og **61**, med Atlas.) København : C. A. Reizel. 1921.

In 1913 Dr. Louis Bobé and Prof. Ad. S. Jensen drew up a plan for an authoritative work on Greenland in commemoration of the two-hundredth anniversary of Hans Egede's landing in Greenland on 3 July 1721. Explorers, men of science, government departments and officials lent their services, and the Kommission for Ledelsen af de Geologiske og Geografiske Undersøgelser i Grønland, which years before had considered the production of such a work, undertook to issue the volumes with the gentlemen named in the title as editors. At the same time the Commission proposed to publish two works instead of one, namely a geographical, topographical, and historical description of Danish Greenland in the Danish language, in two volumes, and an English work in three volumes with the title 'Greenland to the second Century of Danish Colonization,' the latter to be a scientific monograph of Greenland's geography. The Carlsberg Fund has provided the cost of the English work, but no information is given in the preface as to the time of publication.

The Danish work, which has now been entitled simply 'Greenland,' as the whole of the island has lately been included under the Danish administration, includes, firstly, a general survey of the geography, geology, meteorology, glaciation, flora and fauna, the inhabitants and their mode of life, means of subsistence, occupations, statistics of population, mortality, trade, etc., administration, missions, education. Here is collected a large mass of information formerly to be found only in the old books of H. Rink, occasional articles on the *Meddelelser*, and narratives of travellers, but now brought up to date. The remainder of the volumes consists of separate descriptions of each district, its geology, hydrography, etc., the centres of population, the animals, birds and marine forms which are most prevalent and furnish food to the people, the trade and administration, etc. In short, each district is as fully treated as if it were an independent country. The atlas contains a general and a geological map of Greenland, maps of the districts, most on the scale of one to a million, and plans of colonies and trade outposts. Numerous illustrations are reproduced from books of travellers and naturalists, as well as some which have already appeared in the *Meddelelser*. W. A. T.

GENERAL

A Geography of Imperial Defence.— **Vaughan Cornish.** London : Sifton, Praed & Co. 1922. *Maps.* 6*s.* 6*s. net.*

The defence of the Empire is not so much a subject of popular interest as it should be. The attitude of the public towards it is one of its usual apathy.

"Time enough to think about defence when we know who is going to attack us"—and there is just this much to justify that attitude, that mechanical developments for conducting war increase and change so rapidly that the conclusions formed from the study of modern conditions for defence may be out of date even in the near future. Nevertheless the geography of the matter stands fast, and there are certain fundamental geographical considerations which must always demand recognition. It is with these considerations, or principles, that this little book deals in plain untechnical language, and if in dealing with so many-sided a subject Dr. Cornish's conclusions are not always convincing, there is much valuable geographical material well set out by an expert geographer to support them.

Commencing with the geography of "population and efficiency," the author gives us a detailed estimate of the world's capacity for supporting a white population, as well as a forecast of what the numerical future of the white races is likely to be as compared with orientals. There is further a consideration of the relative efficiency (not entirely as a military problem) of occidentals and orientals—all of it useful study but not directly affecting the question of defence. Dr. Cornish, whilst fully aware of the terrible handicap to our country of overpopulation involving the necessity for importing food, is still inclined to believe in the theory of numbers as applied to Imperial defence, and to put his trust in quantity rather than quality. He assumes that the "military foundations" of the Empire are to be found in Great Britain, Canada, South Africa, Australia, and New Zealand, with a recruitable population of 55 millions. He leaves Ireland out of account—and India. He then proceeds to a careful analysis of ways and means (illustrated by several useful maps) and details of the world-wide routes by which food is to be brought to the surplus 28 millions of Britain's population which are dependent on outside supplies, as well as the Colonial over-seas contingents that must be summoned to the help of the mother country. This assumes, of course, that Imperial defence will be against European aggression. Incidentally he points out the important geographical fact that the one European country which holds ports and positions threatening those routes is France. Great Britain, in Dr. Cornish's opinion, would be difficult to blockade even were our fleet out of action, but he cannot disguise its vulnerability when subject to attack from the air. He considers that London could easily be destroyed in a single night by the air forces of the future. Here, of course, is the great weakness of any attempt to forecast the future of Imperial defence. At present it would seem that when Armageddon is fought to a finish neither "ships in thousands" nor "men in nations" will count for much against an efficient and well-equipped air force.

A geographical consideration of all the weak points of the Empire necessarily ranges rather wide. Mesopotamia, for instance, is regarded as a very weak point. References to India are not quite happy. The map illustrating the Frontier is far from perfect, nor can we agree that the Sulaiman and Kirthar ranges are offshoots of the Himalaya. Dr. Cornish's view of the defence of India against an army "based on European arsenals" is, he admits, rather premature, there being no prospect of any such army being able to take the field for many years to come. He regards the defence of India entirely from the land point of view; although it may well prove eventually to be a problem of sea power. A consideration of the Geography of Defence almost necessarily involves some reference to the Geography of Attack, and thus one of the most important chapters of this book deals with the probability of a combination of Germany and Russia against the Empire, and the relative geographical position of those

two Powers both to India and ourselves. Their strength numerically in Europe would be in the proportion of about 4 to 1 of that available for Imperial defence *if* Great Britain depended on her own and her Colonial resources alone. The consideration of the Empire in alliance with other countries is obviously beyond the scope of the book, which, within its own geographical limits, offers the reader many most valuable suggestions and deals with an intricate subject in a most attractive way. It is a book to be not merely read but studied.

T. H. H.

Principes de Géographie Humaine.— The late **P. Vidal de la Blache.** Paris: Armand Colin. 1922. Pp. viii., 328. *Four coloured Maps and two in black and white.*

In reviewing this work it is essential to bear in mind not only that it appears posthumously, but that it was left by the author incomplete. We do not know even the whole plan of the book. Prof. E. de Martonne, under whose care the volume has been published, has found himself obliged to append as fragments certain pages—on the formation of races, on the spread of certain inventions (the plough, the wheel, draft animals), on modes of life and the domains of civilization, on the town—for which he has found it impossible to find the place in the chapters approximately complete. Prof. de Martonne thinks that the author if he had lived would certainly have treated the subject of towns at length. One would also have much liked to have had from Prof. de la Blache a considerable chapter on the difficult subject of political geography, though it should be mentioned that the text as it stands has provision for many considerations of the kind that Prof. Brunhes gives in his chapter on "Political and Historical Geography." The volume as issued, after a short introduction on the "Meaning and Aim of Human Geography," is divided into three parts, entitled respectively "The Distribution of Man over the Globe," "The Forms of Civilisation," "Transport" (*La Circulation*). It is obvious that these divisions must overlap one another, and that much of what is said in an earlier division anticipates what falls to be stated also in a later division. Probably if the author had lived he would have eliminated some of these repetitions—would have made up his mind as to the most appropriate part of his work in which to introduce certain observations. In any case, the convenience of the division will be generally recognized. As to the meaning and aim of human geography the author is quite clear, though on this, of course, he can have nothing new to say. The aim is to show the nature of influences connected with place on human life and evolution, but no one recognizes more fully or more insistently than he the fact that social organization, however primitive, must always be taken into account in connection with such influences (pp. 33, 39, 97–8, 114, 115–6, 121, etc.). Geography lays down conditions, in some cases absolutely limiting conditions; it offers opportunities. But man as a social being must make the best he can of the conditions in given circumstances—must do his best to turn opportunities to his advantage. The importance of opportunity, especially when more or less suddenly presented to people who had been trained under harder conditions, to turn such opportunity to account, is again and again emphasized (pp. 57–8, 80, 93, etc.). But, however great the opportunities may be, however extensive and varied the equipment of a society for utilizing those opportunities, "the emancipation from the immediate environment (*le milieu local*) is never so absolute as our citizen eyes would lead us to believe" (p. 121). As Prof. Brunhes puts it, "we never free ourselves entirely from terrestrial facts" ('Geog. hum.,' 2nd edit. p. 609).

On the general value of Prof. Vidal de la Blache's work the present

reviewer would heartily endorse what is said by the editor in his brief introduction. He has, he thinks, made more notes from this volume of points to reflect on than from any other work of equal size, and probably any other geographer would have a similar experience. Among these points room may perhaps be found to mention the following: the great and varied importance of the invention of fire (pp. 28, 31, 56); the value of the work of herbivores as an aid in providing man at the expense of the forest with free spaces to occupy (p. 32), the importance of which has recently been so strikingly enforced by Miss Newbigin in her presidential address to section E of the British Association; the special advantage of Europe over other parts of the world in providing opportunity for the mutual operation of a combination of geographical features not found elsewhere (p. 214); the geographical importance of natural facilities for the construction of roads (p. 225) and the laying of railways (p. 240); the slowness with which men came to appreciate the geographical significance of railways—the St. Simonians excepted (p. 246); the influence of modern developments in navigation in depriving continental regions of their superiority (p. 229); the influence of navigation and fishing in bringing about local fusion of races (pp. 264–5). One of the maps in black and white illustrates the geographical distribution of the cultivation of the chief cereals and the rearing of sheep, the other "the urban periphery of the arid regions." The coloured maps at the end of the volume illustrate respectively the distribution of population, the distribution of materials derived from the vegetable kingdom, that of materials from the animal kingdom, and that of constructive materials and the different forms of construction. There is an excellent analytical index in addition to an index of authors cited. We now have two excellent works on Human Geography from France, one of which has undergone an extensive re-elaboration, and one in English from America. There is still abundant room for another. G. G. C.

A Commercial Geography of the British Empire.— L. W. Lyde. London: Methuen & Co. 1922. Eleventh edition. Pp. 146. *3s. 6d.*

Prof. Lyde has largely rewritten this edition of his well-known school book, omitting some of the purely physical sections of the introduction to the original work. No writer of text-books can make them more interesting or informative than Prof. Lyde. He lays stress on the really important economic aspects of each country, and is courageous in his omissions of what does not appear to him to be essential. In such a sketch there are bound to be statements open to criticism. That "Australia has no mountains of any really serviceable height" is an unfortunate expression when the influence of the eastern highlands on the rainfall is considered. "The islands of the Arctic Archipelago have shores admirably adapted for shipping, soil of great natural fertility, and abundance of mineral wealth: but the climate makes the islands quite unfit for human habitation." Here is a contentious statement that certainly requires explanation. But the book as a whole is admirable, and if used in conjunction with some more general book, deserves wide acceptance. R. N. R. B.

Water Resources: Present and Future Uses.— Frederick Haynes Newell. Yale University Press (London: Oxford University Press). 1920. Pp. 310. *Illustrations from Photographs.* *20s. net.*

The author of this book is Professor of Civil Engineering in the University of Illinois, and he published the work as a contribution to the post-war reconstruction so greatly needed, but in many countries so little undertaken. He points out the importance of the conservation and utilization of water for many

purposes, such as irrigation and the provision of mechanical power, and his special contribution is a discussion of these matters "in connection with a consideration of the all-important question—will it pay?" To emphasize this point of view he employs a new term: hydro-economics.

The work is of wide extent, for there are detailed and quantitative studies of precipitation, evaporation, run-in, and run-off, which deal necessarily with fluctuations as well as averages and totals. Next the storage and regulation of water are considered, actual works carried out in the United States being described and discussed. Then the uses of water are treated in a similar way, the problems of irrigation, of water-power, of water-transport, of drainage, and of fisheries being considered in the concrete, while the "all-important" matters of finance receive attention as well as the engineering methods.

To the geographer the book offers much useful material. The data collected in the chapters on precipitation, evaporation, run-off, and run-in can be utilized in the study of physical geography; they are actual facts, not generalizations of uncertain validity. Similarly, the accounts of the methods and results of utilizing engineering works for agriculture, manufacturing, and transport may be of great service in the study of economic geography. Also the whole trend of the book is such that the geographer may read it with advantage, for it is essentially correlative; the inter-relations between the phenomena are necessarily shown. The reaction between natural conditions and human activities is indeed involved throughout, and to suggest the wide outlook taken by the author, the title of two of the many excellent photographs may be quoted: "Sheep grazing along canal in vicinity of Huntly, Montana, illustrating how they may be used to keep down the weeds on canal-banks"; and "Apache Indian labourers at Roosevelt Reservoir in Arizona." The employment of these Indians was made possible by the construction of works for water conservation. J. F. U.

Les Grands Marchés des Matières premières.— F. Maurette. Paris: Armand Colin. 1922. Pp. 198. *Maps and Diagrams.* 5 *frs.*

The Collection Armand Colin of which this forms a volume comprises short authoritative books on various aspects of knowledge, suitable for the reader of some education. The aim of this volume is modest and it deals only with the economic geography of coal, corn, wool, cotton, silk, rubber, iron, and mineral oil. Each is treated on the same plan: geographical and economic factors in the trade, areas of production, and markets. Small black and white maps illustrate distributions. Statistics of pre-war and post-war date are given, and there are fairly full bibliographies to each chapter. The book would certainly be of use in connection with a text-book of economic geography. Its scope is limited, but its treatment is thorough. R. N. R. B.

Traité Comparatif des Nationalités. Tome premier. Les Eléments Extérieurs de la Nationalité.— **A Van Gennep.** Paris: Payot. 1922. Pp. 228.

Prof. Van Gennep introduces his work with a discussion of the word "nationality," about which he seems to agree with Auerbach that it is a psychic fact closely associated with the condition that the people concerned must—whatever their origin, tongue, culture—have shared the same lot for a long time; but he fails to note how clearly this is associated with limited areas and definite frontiers, so that the people within these must have the necessary

intimacy of intercourse and similarity of experience. He points out that the conception is by no means so recent in origin as most persons assume, being essentially identical with what may be called patriotism; the novelty of to-day is the claim that those who wish to join together in a "nationality," have a natural right to do so. Historically, almost the contrary was true: the base of union amongst the Swiss lay behind the fact that their land was a continual battle-ground for three great mutually hostile powers, and to maintain the union it was necessary to foster a patriotic feeling, *e.g.* in schools and by exchange of recruits. In only one case, that of the Poles in 1464, was there any real anticipation of the modern "self-determination."

The rest of the book is devoted to a full and suggestive analysis of "the symbols" of nationality—the frontier being one—carried out in a typically French way to logical, even if occasionally absurd, conclusions; and the evolution of these is traced from woad and tatoo through dress, architecture, and script (*e.g.* gothic and cyrillic) to the national flag and the national anthem. A wise caution is given on the subject of social customs, *e.g.* the *slava* which the Serbs claim to be peculiar to themselves has been found throughout practically the whole of the Old World. But all these symbols Prof. Van Gennep looks upon as episodic or accidental—a conquered people could do without them, and yet keep a profound sense of their own nationality; they are not nearly so striking and enduring as language, even though the latter acquired value as a symbol only during the nineteenth century, few governments looking upon any special speech—other perhaps than Hebrew or Arabic—as needing surveillance or suppression. Of course, all this has been changed in later times; and the contact of standardized kindred languages, *e.g.* Polish and Russian or Portuguese and Spanish, has come to suggest opposition rather than kinship. This makes it grotesque to make "the linguistic family," *e.g.* Latin, Germanic, or Slavic, the base of any political union, *e.g.* Pan-German or Pan-Slavic; it might be the base of economic union, and it is noticeable that ports, *e.g.* in the Mediterranean or even under the old Hanseatic League, do or did not boycott languages or force strangers to use the local speech. At the same time, polyglot peoples do *not* lose the symbolic value of their mother-tongue. Hence, again, however, the author warns against the fallacies based on statistics, *e.g.* the deliberately falsified census of Germany; and, if the figures for so-called civilized countries are so untrustworthy, what credit should be given to those for the more backward?

The chapter on Frontiers summarizes the recent work done on this subject, especially in England; and emphasis is laid on (*a*) the fact that in modern times every boundary tends to be thought of as an ideal line; (*b*) that the care taken to fix it is a modern development—the "zone" idea being essentially primitive, though it lingered on in Europe as the March; and (*c*) the overestimate of the sea as a frontier, when it is a highway much more than a barrier. The author analyses the two meanings of "natural frontiers"—discarding both (p. 162); he thinks that a navigable river is the best frontier because it approaches most nearly to an ideal line, but doubts the practicability of having a frontier through the natural unit of the river-basin; and he discusses at length (chapter viii.) linguistic and economic frontiers, minimizing the value of the former and inquiring how far the soil and the sub-soil should be regarded of equal importance in the case of the latter. If the soil is subordinated, the people "who live on the surface" may be separated in spite of conscious and traditional affinities. In any case, economic frontiers would be no more stable than strategic frontiers; and, as a matter of fact, symbols acquire full

value only when nationality is in danger). Contrariwise, when a nationality is convinced of its persistence, many symbols lose their importance altogether (cf. the different attitude of France and Germany to "alien" languages, *e.g.* in Alsace).

The paper covers and the type are rather better than usual for a French book, if in no way worthy of the text, which is extraordinarily interesting, impartial, and complete. L. W. L.

Legendary Islands of the Atlantic: a study in Medieval Geography. William H. Babcock. New York: American Geographical Society. 1922. $3.50.

The progress of exploration, apparently, has always been accompanied by a desire to express for practical purposes the results of exploration in cartographical form. The historical value of maps and charts thus produced depends upon many factors—human, physical, and instrumental—and their authority in consequence varies considerably. It is therefore unlikely that early and mediæval charts may alone be taken as solving the problem of discovery, though it is interesting to speculate what the charted land and sea forms really represent. This volume, which is No. 8 of the Research Series issued by the American Geographical Society, discusses the various islands which by legend or mediæval chart are connected with the North Atlantic. The book is valuable for its presentation of a subject which is well worthy of attention, and its value is increased by the numerous reproductions of relevant portions of the maps. Where the author has limited himself to mere description there can be little controversy, but his suggestions for the pre-Columbian discovery of the West Indies and the pre-Cabot discovery of the St. Lawerence need much more evidence than the maps themselves supply. A case no doubt may be stated for the former on the evidence of such maps as Beccario (1435) and Bianco (1436), but it needs a lively faith to see in the Brazil island of the Catalan map of 1375 the enclosing land of the St. Lawrence Gulf and its containing islands. W. H. B.

Clouds. A Descriptive Illustrated Guide-Book to the Observation and Classification of Clouds.— **Geo. Auborne Clarke, F.R.P.S., F.R. Met. Soc.** London: Constable & Co. 1920. Size 8½ × 5½; pp. 131; Pl. 40. 21*s. net.*

This book comes at a fitting interval after the earlier English works of Ley and Clayden on the subject. It discloses striking powers of observation and an intimate acquaintance with the scenery of the sky, whilst the physical explanation of typical cloud forms is on the whole well presented. Half the volume consists of plates, and although these are excellent, one feels that the serious student who after all can watch the sky for himself might prefer a more liberal allotment of letterpress in lieu of so many pictures which have made the price so high. One of these, plate 35*b*, illustrates finely a fact comparatively little known, namely, the decidedly increased luminosity of the sky inside the primary arc of the rainbow, and the feature is duly commented upon and accounted for.

The author speaks of the flocculent cirro-cumuli as the most beautiful of all clouds, and certainly the unique delicacy of the high-level forms must be conceded; but one can only contrast, not compare, them with the massive thunder piles which reveal beauty of a more austere and rugged order. The chapter devoted to the discussion of cloud-forms is rather disappointing, and no reference is made to the striking resemblance frequently, and indeed typically, shown by the cumulo-nimbus ranges to mountains, an analogy pressed not only by Ruskin but also by Tyndall.

Mr. Clarke's experiences are derived mainly from the neighbourhood of Aberdeen, where he is on the staff of the King's College Observatory; but he is fully alive to the fascinating question of the geographical distribution, not so much of the main types which are more or less universal, but of the varieties of these. L. C. W. B.

The Teaching of Geography and Economics.— London: Pitman & Sons, Ltd. 1921. 2*s.* 6*d. net.*

The Scope of School Geography.— **R. W. Rudmose Brown, D.Sc., O. J. R. Howarth, O.B.E., M.A., J. McFarlane, M.A., M.Com.** Oxford: Clarendon Press. 1922. Pp. 158. 5*s.* 6*d. net.*

The Teaching of Geography.— **M. E. Branom and F. K. Branom.** Boston: Ginn & Co. 1921. Pp. viii. and 292. 8*s.* 6*d. net.*

The two last-named books should be read by all interested in geography and the teaching of the subject. One presents the British point of view, the other the American. The former endeavours to define the content of the subject for the purposes of secondary education, and thereby lays emphasis on the unity and "specialist" character of geography. The latter adopts the viewpoint of the American "project" system, in which a particular subject or group of subjects determines the character of school work and gives to it a special "side" or outlook. The book ably shows the relation which geography may hold towards other subjects, and indicates how it may form the centre of study, "because of the emphasis that geography has always placed on present situations. This subject naturally becomes the nucleus for the organization of all school work on a project basis. In the development of the world's fair project various subjects contributed, but the fundamental subject was geography." W. H. B.

THE MONTHLY RECORD

EUROPE

The Vendomois as a Geographical Unit.

THE old "pays" of France afford excellent instances of natural regions, the unity of which has impressed itself upon their inhabitants from early times, and which still retain a surprising vitality in spite of their supersession by the artificial administrative units of modern times. To the many studies of such "pays" which have been produced in France of late years Prof. Camille Vallaux has added one of the Vendomois or territory of Vendôme, about which he is particularly competent to speak, having spent all his youth in the district, and with an early bent towards geography has thoroughly absorbed its atmosphere (*La Géographie*, July–August 1922). The Vendomois embraces a section of the valley of the Loire between the contrasted units of Le Perche on the west and La Beauce on the east, together with a series of tributary valleys, some of them now dry in their upper courses but none the less naturally linked with the rest of the system. It includes a variety of landscapes and modes of life, due especially to the difference between the limestones with their poverty in water to the north of Vendôme and the clay with its numerous springs to the south; but the whole tends towards the broad and smiling valley of the Loire, which binds together all parts of the district and gives it its harmonious unity. By means of their ramifications the life of the valleys is everywhere extended, as it were in long filaments, into the very heart of the plateaux. It is the abrupt valley slopes alone that give any impression of altitude in a

region so flat in its general surface that even 50 metres means much. Whilst the plateau dwellers suffer from cold, from exposure to the violent *galerne* wind, and from severe thunderstorms, the valley dwellers and their crops alike enjoy shelter. The caves hollowed out in old days by human agency along the plateau escarpments serve a variety of purposes, even that of dwellings, but above all as wine-cellars. The houses of the peasants are built in long lines parallel to these tiers of caves, which play an important part in the social and business life of the community. Although the position of Vendôme is advantageous, it is not easy to account for its choice as a centre of human activity except from its situation on the borderland between lands of varying character —forests and pastures, cornfields and vineyards—which predestined it for the *rôle* of a market town. The old social and economic autonomy of the Vendomois is threatened by modern changes, but in Prof. Vallaux's opinion the "pays" is not destined to disappear, although the modern administrative conditions in no way tend to its survival. It is its physical geography—the connection supplied by the Loire and its network of valleys—which will preserve its distinctive character.

Projected Atlas of France.

Various countries have of late years undertaken the publication of National Atlases in which the local geography can be elaborated from all points of view in a way which is impossible in more general atlases, and even countries of the second rank such as Poland and Finland have produced excellent specimens. In France the project of such an atlas has lately begun to take shape, and the present position is explained in *La Géographie*, July–August 1922. After preliminary discussions between Colonel Bellot, Director of the Service Géographique de l'Armée, and M. Robert Perret, Secretary of the Topographical Section of the Comité National de Géographie, the latter body was asked to appoint a special committee to push forward the project, and this was done last January, M. E. de Margerie being chosen as President, with MM. Demangeon and de Martonne as Vice-Presidents, supported by other well-known geographers. After meetings held in January and April it was decided to collect the views of specialists in the different branches of the subject, and reports have already been handed in on the basis of which a definitive programme is being elaborated by the Bureau of the Committee. The project will be welcomed by geographers of all countries.

Italian and Slav in Istria.

The way in which a study of surnames may help to throw light on the true ethnic composition of a population is illustrated by an article in the *Bollettino* of the Italian Geographical Society (1922, Nos. 5–6), in which Dr. G. Gravisi deals with the surnames common in the interior districts of Istria, supposed to be almost entirely occupied by Slavs, the whole of the sea-board and the towns in which Italians chiefly congregate being excluded from the study. The writer supplies an extensive preliminary list of surnames undoubtedly of Italian origin current in these Slav districts, arranged according to the Commune in which they occur, giving also lists of names the origin of which is more open to question. Considering that the area dealt with is ostensibly almost purely Slavic, the number of the Italian names is certainly striking, and shows how misleading a superficial examination of ethnic indications may be in such a case. The re-incorporation in Italy of the districts in question finds increased justification from this evidence of the surnames.

ASIA

Spelling of Names in the Karakoram.

We are sorry to see, from an article by Prof. G. Dainelli in the *Rivista Geogr. Italiana* (April–June 1922, p. 162), that the remarks in the note on p. 376 of the May number of the *Journal* on the Italian mode of spelling names in the Karakoram have been taken somewhat seriously to heart by him, as the editor responsible for the publication of the scientific results of Sir F. de Filippi's expedition to that region. He points out, no doubt with justice, that there has been no international agreement, so far, for the adoption of a uniform system of geographical orthography, and that until this is arrived at it is only natural that publications intended primarily for Italians should use spellings which will convey a correct idea of the true sounds to a majority of their readers. Readers of other nationalities sufficiently conversant with Italian to make use of Italian books will, he says, know at once what sound is represented by Italian spellings such as Sciaiok. We certainly had no wish to imply an obligation on the part of Italians to conform to the English system, but merely to suggest that a voluntary change on their part might bring us a step nearer the international accord which Prof. Dainelli himself allows to be desirable. He points out, further, that the foreign student who should trust to the spellings of Indian official publications, such as the 'Indian Atlas,' even with regard to the vowels (supposed to be used as in Italian) would be led into many errors, owing to the impossibility in which the compilers of the Indian maps have found themselves in certain cases of arriving at the correct forms in the absence of patient inquiry on the spot by travellers and surveyors. Such inquiry on his own part, while a member of the Filippi expedition, caused him to revise many of his ideas as to the correct pronunciation or form of the names. A special instance quoted is that of the village universally given as *Pandras*, in the valley to the north of the Zoji-la, which Drew supposed to mean "Lower Dras," although really higher up the valley than Dras itself. The true name, Prof. Dainelli says, is *Prandas*, from the Dard words *pran*, the name of a herbaceous plant abundant in the neighbourhood, and *das*, a landing-place. While introducing such corrections into the publications in question Prof. Dainelli intends to include the forms of the Indian Atlas in the general index of place-names, with cross-references to the variant forms adopted.

Climatic Conditions of North-East Siberia.

A study by Stanislaus Novakovsky of Clark University on "Climatic Provinces of the Russian Far East in relation to Human Activities" appears in the *Geographical Review* for January 1922. The Russian Far East, comprising the four administrative provinces of Amur, Primorskaya, Sakhalin and Kamchatka, is a territory forming a longitudinal strip between the Pacific and the Siberian interior, and has the general monsoonal type of climate characteristic of Eastern Asia, somewhat modified as to continentality by proximity to the sea as well as by the relief afforded by the Stanovoi and Khingan mountain ranges, which constitute an effective wind barrier. The region is divided into seven distinct climatic provinces ranging from the inhospitable northern extremity of Asia with a mean annual temperature round 15° F., consisting chiefly of tundra with fishing and hunting as the chief basis of life, to the rich agricultural and forested country round Vladivostok towards 40° N., where the mean temperature near 40° F. is some 15° lower than in corresponding latitude in Western Europe; the productiveness of this Ussuri region being connected

with a hot, if short, continental summer. The rainfall of the Russian Far East is largely of the summer type, but the peninsula of Kamchatka stands out conspicuously for its enormous snowfall. If we review the region as a whole a conspicuous feature is the coldness of spring and early summer due to deeply frozen soil and still more to the abundance of ice in the Sea of Okhotsk, the temperature of May relatively to August being remarkably low in comparison with Western Siberia and European Russia. Ice and cold water with the accompaniment of chilling summer fogs are, in fact, the distinguishing local climatic factor of this coast, so much so that one may regard the Russian Far East as the very antithesis of North-Western Europe at the other side of the Eurasian land-mass. For whereas in north-east Asia a potentially hot continental summer is materially curtailed and chilled by ice-cold water, in north-west Europe a potentially cool oceanic summer is rendered longer and warmer than it would be with the same insularity by the Atlantic reservoir of heat; and in this connection it may be pointed out that, though the *relative* heating effect of the warm Atlantic drift on the British Isles is much greater in winter than in summer, the *absolute* heating effect of the same is greater in summer, the Atlantic surface being then at 60° F. instead of 50° F. as in winter, so that the south-westerly winds reach our shores with a base temperature ten degrees higher. This point is often not sufficiently appreciated.

Navigation of the Tigris.

With reference to previous attempts to navigate the Tigris as mentioned in Lieut.-Commander Elwell-Sutton's paper (*Journal*, vol. 60, p. 20), the latter has since been informed that Lieut.-Commander E. Plummer, of H.M.S. *Sedgefly*, made an attempt in 1917 and succeeded in getting as far as Barurah, but was then stopped by the river falling.

AMERICA

Rasmussen's Researches among the Eskimo of Northern Canada.

A report was received in Copenhagen towards the end of October of the past year's work done by the Danish explorer Rasmussen and his coadjutors among the Eskimo of Baffin Land and adjacent parts of the mainland of Northern Canada, and a summary of it appeared in the *Times* of October 28. The results gained during last winter are said to have been most satisfactory, although the journeys of the various members of the expedition were carried out often under trying conditions of weather. While Freuchen and Matthiassen, with two Polar Eskimos, mapped the north coast of Fury and Hecla strait and the land between Gifford and Admiralty inlets, Rasmussen stayed with the little-visited Igdlulik Eskimo near Cape Elizabeth, gaining an insight into their life and religious ideas. On March 24, after returning to his headquarters, he started for Chesterfield on the western side of Hudson bay, studying the Eskimo there with the help of a Greenland interpreter, and proceeding to Baker lake, which he reached on May 11. Being joined by his assistant Birket Smith, who had been doing anthropological work in the small island of Orpigtujak, he went with him to Yathkied lake, making the acquaintance of three inland tribes of Eskimo, who live in the greatest isolation and have only lately begun to migrate towards the sea. Many had not seen a white man. After some difficulty intercourse was established, and Rasmussen gained their confidence sufficiently to be able to collect their legends and witness demonstrations of their conjuring tricks, which were simpler than those of the Greenland Eskimo, while the people were generally

on a much lower level than the latter, though their legends agreed. Their technical skill and implements were of the simplest, and the general conclusion reached (which agrees with Steensby's theory) is that these tribes have never lived near the sea, but are the last survivals of the primæval Eskimo who, originally inland dwellers, migrated hence to the Arctic coasts. Stone houses are unknown, the people living in unheated snow huts. They make *kayaks* of reindeer hides and use the Indian canoe, and they subsist by salmon-fishing and reindeer-hunting. The expedition returned by different routes to Orpigtujak island, Rasmussen arriving at Chesterfield on July 30.

Dustfall in the United States, March 1920.

A systematic study of dustfalls has so far been made by comparatively few observers, although the results gained are of considerable interest when the data collected permit the determination of the areas over which the fall has taken place and the place of origin of the dust. The great European fall of February 1903 was carefully investigated by Dr. Mill and Mr. Lempfert (cf. *Journal*, vol. **23**, p. 516), and a limited number of other European falls have been studied by other observers. Dust-falls in the United States have been observed within the past few years by Prof. A. N. Winchell of the University of Wisconsin and Mr. E. R. Miller of the United States Weather Bureau, who have reported their results in the *American Journal of Science* and the *Monthly Weather Review*, the great fall of 19 March 1920 being dealt with in the former journal for May 1922. As a considerable area in the States was under snow at the date of the storm, while the precipitation during the storm was also partly in the form of snow, the fall could be observed with comparative ease. The meteorological conditions that gave rise to the storm reproduced those of the previous dustfall of 8–9 March 1918, the storm centre sweeping across the States, in a course concave to the north, from the mouth of the Columbia to Lake Ontario, with a secondary centre which developed in Arkansas and followed an eastward course parallel to that of the main storm. It is interesting to note that the region of intensest wind, in north-eastern Colorado and south-eastern Wyoming, remained unwetted during the storm and was also uncovered by the previous snowfall, so that the supply of soil material was greatest from this area, though smaller contributions were probably received from most of the south-western States. On the other hand the distribution of the rain and snowfall made possible the precipitation of the dust over most of the eastern half of the States. A chemical analysis of the dust showed that in the percentage of alkalis and alumina it did not differ markedly from that of European falls derived from the Sahara, though the percentage of silica was greater than in most of the European falls, and the red colour due to oxidation of the iron in dust from the Sahara was absent. In some respects the dust collected resembled the loess of the Mississippi valley both in chemical and mineral composition, though the extreme fineness of the components make it difficult to arrive at satisfactory determinations of the mineral constituents. The exceptional richness in quartz was however well brought out, while the content of feldspar seemed about the same, but that of kaolinite and calcite less than in foreign dust-falls. The fineness of the dust was even greater than in the American fall of 1918. Both for the amount of the fall and the area covered the fall of 1920 certainly equalled, and probably much exceeded, the European fall of 1901.

POLAR REGIONS

Lauge Koch's Expedition round Northern Greenland.

In the *Journal* for October 1920 (p. 323) we gave a short outline of the proposals of Mr. Lauge Koch for a new expedition to northern Greenland, intended as a contribution to the bi-centenary celebration of the departure of the Dane Hans Egede for Greenland in 1721.* During 1921 the proposed journey was successfully accomplished, though the explorers came in for a good share of the hardships and dangers inseparable from such hazardous undertakings. A short preliminary account, in Danish, appears in the *Geografisk Tidskrift*, 1922, Hefte vi. The start was made with nineteen sledges from the headquarters on Inglefield Gulf, on 18 March 1921 ; the supplies including 1500 kgs. of pemmican and the same amount of walrus meat. After putting in at Fort Conger in Grant Land, the party crossed Robeson Channel to the Greenland side over smooth new ice. Beyond this the polar ice was much less broken by pressure ridges than had been anticipated. After the last supporting party, with three sledges, had been sent back from Frankfield bay, the party continued along the northern coast, passing 83° N. on May 1, and four days later reaching De Long fjord, the leader's furthest point on his previous expedition with Rasmussen in 1917 (*Journal*, vol. **52**, p. 63). Here the work of detailed mapping began. A trip out over the pack to the north led to 83° 50' N., the highest latitude attained. Captain J. P. Koch's camp at Cape Bridgman was reached on May 21, and the Danish flag hoisted to mark the completion of the whole circuit of Greenland's coast by Danish explorers. Snow and fog were now encountered, and the failure to find musk-oxen was a disappointment ; but a few were eventually secured, and also some seals after the expedition had pushed up Independence bay as far as Brönlund fjord. A hill was climbed for the purpose of reconnoitring, and it afforded a magnificent view over the whole country, revealing the existence of a fine lake and a great valley forming a cleft in the plateau which was evidently the feature mistaken by Peary twenty-seven years earlier for the supposed channel named after him Peary Channel. The ascent to the inland ice for the return journey proved no easy matter : the season was so far advanced that the snow was everywhere melting, and the explorers were constantly wet through. Want of food made it necessary to kill most of the dogs, and reduced the survivors to such a state of weakness that the men had to drag the sledges themselves. In fact the whole return journey became a mere race for life, and disaster was narrowly escaped. When nearly at the last extremity help was derived from a gale of wind, which permitted the rigging up of an extemporized sail and so carried the sledge along with all the party on board. The edge of the inland ice was reached after a traverse of 700 kils., and succour found at the depôt which had been laid on the coast of Washington Land.

MATHEMATICAL AND PHYSICAL GEOGRAPHY

Forests, Precipitation, and Stream-flow.

A most interesting experiment has for some years been in course of execution at a specially chosen locality in Colorado, with a view to testing by actual observation the effects of the removal of a forest cover on stream-flow and erosion within the drainage basin from which it has been removed. Two

* As already noted, participation in the first two of the previous expeditions referred to in our note was erroneously attributed to Lauge Koch, through confusion with his relative Captain J. P. Koch.

contiguous catchment areas were selected near the railway station of Wagon Wheel Gap in Colorado (altitude 8437 feet), as similar as possible as to topography and forest cover, the plan being to observe carefully the meteorological conditions and stream-flow for a term of years under similar conditions of forest cover; then to denude one of the areas of its timber and continue the observations as before in order to determine the effects. After eight or nine years' continuous observation the material was considered sufficient for the first part of the experiment, and one of the areas was denuded in the autumn of 1920.

A detailed report on the results so far obtained by Messrs. C. G. Bates and A. J. Henry, has been prepared as supplement No. 17 to the *Monthly Weather Review* (Washington, D.C., 1922), in which paper a full abstract of the report has also been printed (vol. 49, No. 12, December 1921, issued 10 March 1922). The paper begins with a description of the two areas selected from the points of view of relief, geology, and forest cover, the slight differences which affect the results being carefully pointed out. While the two areas differed but slightly in extent, one was considerably longer and narrower than the other, and whereas the longer one stretched fairly regularly from west to east, the other tended rather to the north-east, a fact which involved differences of exposure, and consequently of the conditions of snow-melting. The observations included stream-flow measurements (helped by the construction of dams across the streams), with determinations of air and soil temperature and precipitation in the form of rain and snow (the latter rather less than half of the whole, but yielding considerably more than half of the run-off). It was found that, during periods of rain or melting snow, (1) stream A (with the long narrow catchment) rises more rapidly than stream B; (2) the maximum flow of A is sooner reached, but may be exceeded later, by B; (3) that A may again attain the higher level, with a secondary and more steady volume. These differences are all explainable by the topography. Considering that we have to do with variable factors, each of which is different for the two basins, it is obvious that the detailed analysis of the source of the water in the streams, whether derived directly from precipitation or from percolation from the soil, presents almost insuperable difficulties. An attempt is made to trace the disposal of the precipitation, in the form of run-off, interception, transpiration, and evaporation, the percentages arrived at being 29, 17, 18, and 36 respectively. In the last part of the report the attempt is made to define the relations between the precipitation and run-off in the two areas so as to ascertain the most probable run-off of stream B had denudation not taken place. An accurate determination is admittedly a most difficult matter, but the inquiry cannot fail to yield results of general interest, whatever may be its value towards the solution of the special question for which it was undertaken.

GENERAL

Geography at the British Association.

Dr. Marion Newbigin, in her Presidential Address to Section E (Geography), spoke on the subject of "Human Geography: First Principles and Some Applications." Dr. Hogarth at the Edinburgh Meeting in 1921 had pointed out the increasing specialization of studies which formerly had been comprehended within the subject of geography. Miss Newbigin's address carried the investigation still further and showed "that the most clamant need at the present time is a continuous attempt to make it plain to the community at large that the main interest of geography is not in its facts as such—for if

geography ceased to exist the geologists, meteorologists, botanists, zoologists, and so forth would continue to collect most of these. Rather does it lie in the way in which the geographer studies these facts in their relations to each other and to the life of man." It was pointed out that the nicely adjusted balance of forces, in part physical and in part human, which gives the life of any community of people whether of to-day or of the past, forms a study of direct interest and value to the ordinary citizen. The studies of the successive civilizations of the river lands of Egypt and Mesopotamia, of the Mediterranean, of forested and maritime western Europe, furnish illustrations of man's communal response to the surface phenomena of the Earth in "the aptitudes which the members of a community display, the tools which they use, the kind of knowledge which they accumulate, their modes of organization, their type of material wealth, their traditions and ideals, which show the environmental imprint most closely, far more closely than the colour of their skins or the shape of their heads."

These lessons of the past show how the equilibrium has been and may be again disturbed by internal or more often external shocks. The illustrations above show a steady march of civilizations to the west and north-west, the decline and fall of one marking the rise and growth of another. To-day the wider contacts of the several regions of the Earth, the comparative ease with which waves of disturbance can be transmitted and the equipoise of nations overthrown, increase the need for geographical investigation. "The human geographer should have before him a twofold purpose. In the first place he should strive to show that the deductions which the biologists have slowly and painfully worked out in the course of the last sixty years apply—though with an essential difference, which requires careful definition—to the life of man. Second, he should use his precise knowledge of the surface of the earth to work out detailed applications of those deductions. In other words, human geography is the biology of man, and, on account of man's vast power of modifying his environment, necessitates a fuller knowledge of that environment than can be required of the biologist in the narrower sense. Investigations along these lines would promote greatly the interests of geography as a whole, both by making its value clear to the general public and in justifying that intensive study of the surface relief and the associated phenomena which must always remain its basis."

Gilchrist Studentship in Geography.

We are asked to announce that the Gilchrist trustees again offer for 1923–24 a studentship in geography of the value of £80, which may be increased somewhat, but not so as to exceed £120. The Studentship is tenable at any recognised school of geography. Applicants, who should be teachers with at least two years' experience, should send in their names before the end of January 1923 to Prof. L. W. Lyde, University College, Gower Street, W.C.1, giving references and a full account of their previous work. Three testimonials should be sent with the application.

Goldschmidt Amphibious Boats.

We have received from the Department of Overseas Trade an extract from a communication received from Brussels stating the present position in regard to the adoption of the amphibious boat system as a means of transport in new countries where few roads exist and continuous navigation of the rivers is hindered by the existence of rapids. The present development of the idea is due to Mr Robert Goldschmidt, whose invention was subjected to tests

in 1921 on the canal near Brussels. The system, it is stated, is about to be installed in the district of the Itimbiri river in the north-eastern Congo, where it will permit regular communication between Bumba and Bambili. The French Colonial Government has also decided to establish the system on the Mekong in Indo-China for a distance of 1800 kils., and it is proposed to adopt it on the Amazon in Brazil. The inventor claims that his system could be used with advantage and profit in many other regions, as, for example, to supply communication between Lake Victoria and Rejaf on the Nile, or between Matadi and Leopoldville on the lower Congo.

CORRESPONDENCE

The Use of the Globes.

IN the review of Dr. Stevenson's book on Terrestrial and Celestial Globes in the current number of the *Journal* it is stated that "In the modern curriculum the educational value of an understanding of the use of globes has been entirely lost to sight, yet formerly such an exercise was esteemed one of the most valuable of juvenile studies."

There is a certain amount of truth in this statement, though not, it is to be feared, of the character intended by the reviewer. "Learning the Globes," at a time when modern education was framing its first curricula, had become such a tiresome and unprofitable repetition of meaningless words in the hands of the practitioners of the older type of education that its omission was in the nature of a reform.

To-day, thanks to the enormous advance made in the teaching of Geography in our schools, the use of the terrestrial globe is probably—nay, certainly—more extensive than ever it was before. The number of senior departments in the schools of the country not possessing at least one globe is negligible, a large number possess "blackboard" globes, many have in addition a supply of small globes sufficient for every child in a class to actually use and handle one during the lesson. Moreover, an increasing number of teachers are mounting their globes on simple home-made stands in the open, so that when the sun is shining it is possible to follow the noon sun across the meridian, to watch sunrise and sunset in distant countries, to actually see the polar day and night, to determine declination, the seasons, the length of day and night at various latitudes, and so on. In more than one school miniature sundials have been fixed at large cities so that local solar time is given as well, whereby the relation between longitude and time is demonstrated in a most practical fashion. Further, in London alone permission is being given to twenty-five elementary and other schools to erect wireless receiving sets made by the scholars, so that in a short time signals from various foreign stations will give an additional impetus to the study of the globe and interest in the latest methods for the determination of longitude.

Against James Ferguson's globe of wood I would place globes and hemispheres with cardboard meridians and parallels of string that are constructed in some schools to illustrate the principles of the simpler shadow projections, which are afterwards worked out geometrically.

With regard to the celestial globe itself I know of no case where it is in use. On the other hand, the direct study of the constellations is generally encouraged and is in some cases accompanied by the construction of simple

planispheres, with the result that there is no small appreciation of the celestial sphere itself.

E. J. ORFORD,
Hon. Secretary, Geographical Association.

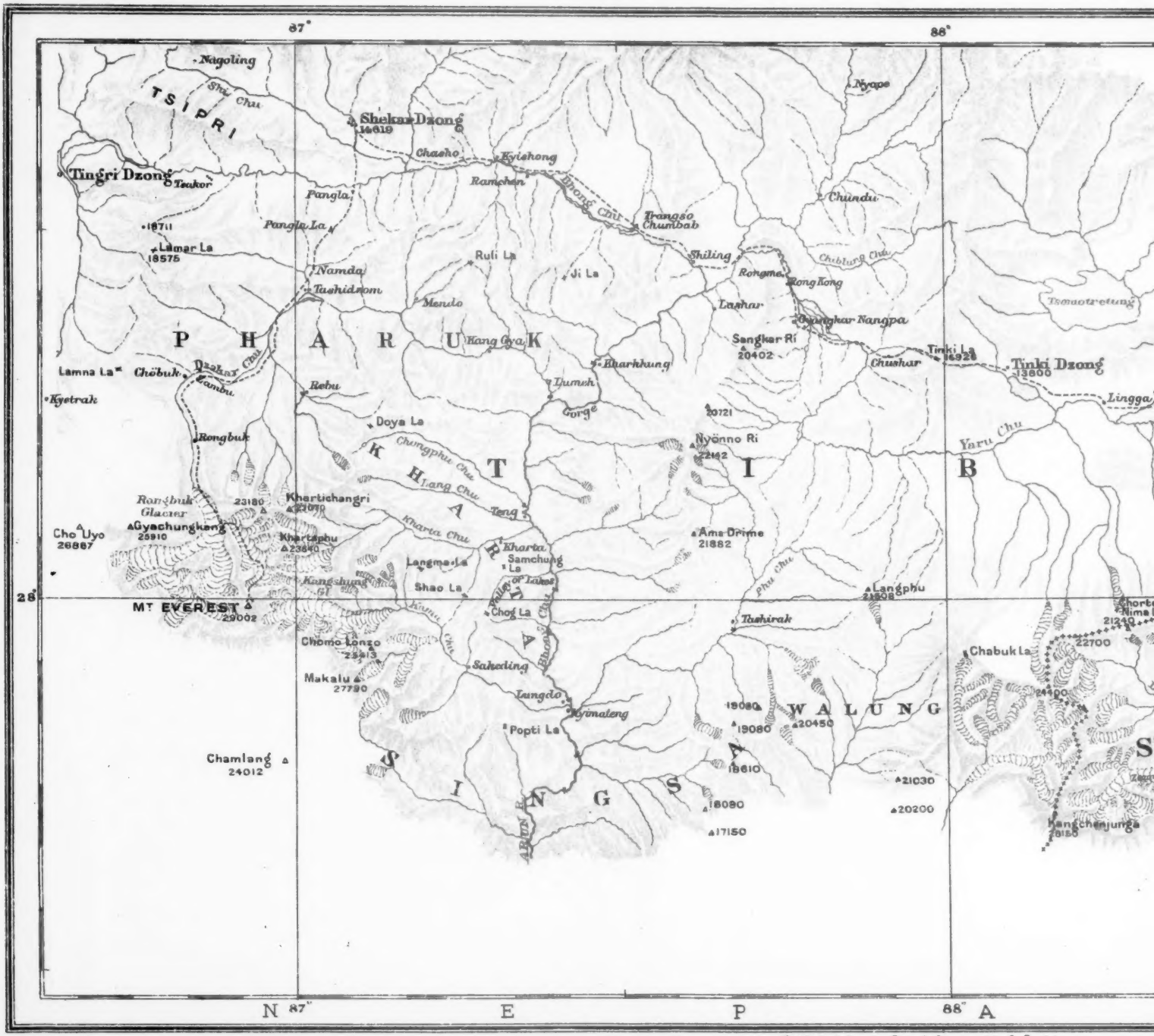
13 November 1922.

MEETINGS: ROYAL GEOGRAPHICAL SOCIETY: SESSION 1922–1923

First Evening Meeting, 13 November 1922.—The President in the Chair.

ELECTIONS.—Horace D. Ashton; Miss Eveline G. Ball; Captain J. J. Bailey; Elisha Bardsley, J.P.; Frank Hogarth Baron; Major Arthur Walter Barrett; Captain W. D. G. Batten; Arnold Michael Bex, B.A.; Rev. Julian William Bilby; Walter Binns; J. Tyndale-Biscoe; Lieut. J. E. H. Boustead; Major Roy Gerard C. Brock; Herbert Courtney Browne; Edwin Henry Booth; Arthur Tasker Burnell; Lieut.-Colonel Charles H. Verstrume-Bunbury; Major Clarence V. Buxton, R.F.A.; Captain W. F. Collender; Miss Christine M. Church; Lieut.-Colonel W. L. de M. Carey; William Eugene Charles, M.A.; Horace O. W. Christy, B.SC., PH.D.; Miss Edith V. Creamer, B.SC.; Lieut.-Colonel D. Cree, M.C., R.E.; Miss Ida Georgina Cumming, M.B.E.; William Dederich; Captain Philip Francis Dale, M.C.; Rev. E. Palgrave Davy; Miss Hannah Gwendoline Dent, B.A.; William Dixson; Captain S. C. R. Duffy, M.M.; Sidney Edkins; William Ellis; Bernard C. Ellison; Harold Feber; Miss Margaret E. Fleet; Harold France; George Edward Goss; Miss Alice Devin Gundry; P. Gurrey. B.A.; Captain James C. Graham; Conway Hake; D. L. Harris; Miss Susan Harris; Major A. L. Holt, R.E.; Thomas Beaumont Hohler, C.M.G.; F. G. Huges; Miss Edith Catherine Humphreys; Herbert Stanley Hunter; W. H. Ingrams; W. Jochema; Miss Winifred Judson; Lieut.-Colonel W. D. V. O. King, D.S.O.; George Knight; Sardar Bahadar Sonam Wangfel Ladenla; Miss Lorna Leatham; Allan Vy Vyan Liddle; Miss Mary Alice Lyster, M.A.; Gerald Macintyre; W. H. Macintyre; Captain John Cameron MacLeod; Captain Colin McDonald; Miss Hilda Maddison; Mrs. Violet O. Cressy-Marks; E. H. Martin; Miss Emily C. Matthews; Sarat Chandra Mazumdar, M.A.; Albert Mayor-Metcalfe; George Milne, M.A.; Harold Lavel Mullins; Miss Madeline Munro, B.SC.; Paul Gerhardt Parkinson; Sir Percival Phillips, K.B.E.; Captain Victor Pope; Frederick Hedley Potton; Reginald Alison Prescott; Captain R. J. Ramsey; Captain Charles Mahon Redhead; Miss Joan Berenice Reynolds, B.A.; Miss Gertrude Ricardo; James Charles Richards; James Alexander Robertson; Thomas Atholl Robertson; Mrs. Augusta Henrietta Roumieu; Alexander Charles Sampson, M.C.; Ernest Arthur Sawyer; Major E. J. Corse-Scott; Miss Kate E. Scriven; Vivian Arthur Sharp; Albert Shaw; Major-General Seymour Sheppard, C.B., D.S.O.; Rev. Arthur R. Slater; Alexander Murray Smith; Chambre Corcer Stillington Stephenson; Lieut.-Colonel William George Stonor; Captain Humphrey C. P. Stronge; Charles Urquhart Stuart; Miss L. K. Symon, O.B.E.; Henry Thomas; Major F. Williams-Thomas; James Thomas; Walter Rees Thomas; Wallace Thompson; Fred Curtis Thornley; Captain Harry Waldemar Turner; Miss Ruth Mansfield Turner; R. G. Turrall; Captain Cotterill Wanstall; W. Reginald Wheeler; Leslie James Wilmoth; Robert Alwyn Williams; Mrs. Frances Mary Wilson; H. A. Woodcock; Alfred Woodfall; George Trevelyan Wrafter.

PAPER: **The Work of the *Quest*. Commander Frank Wild.**



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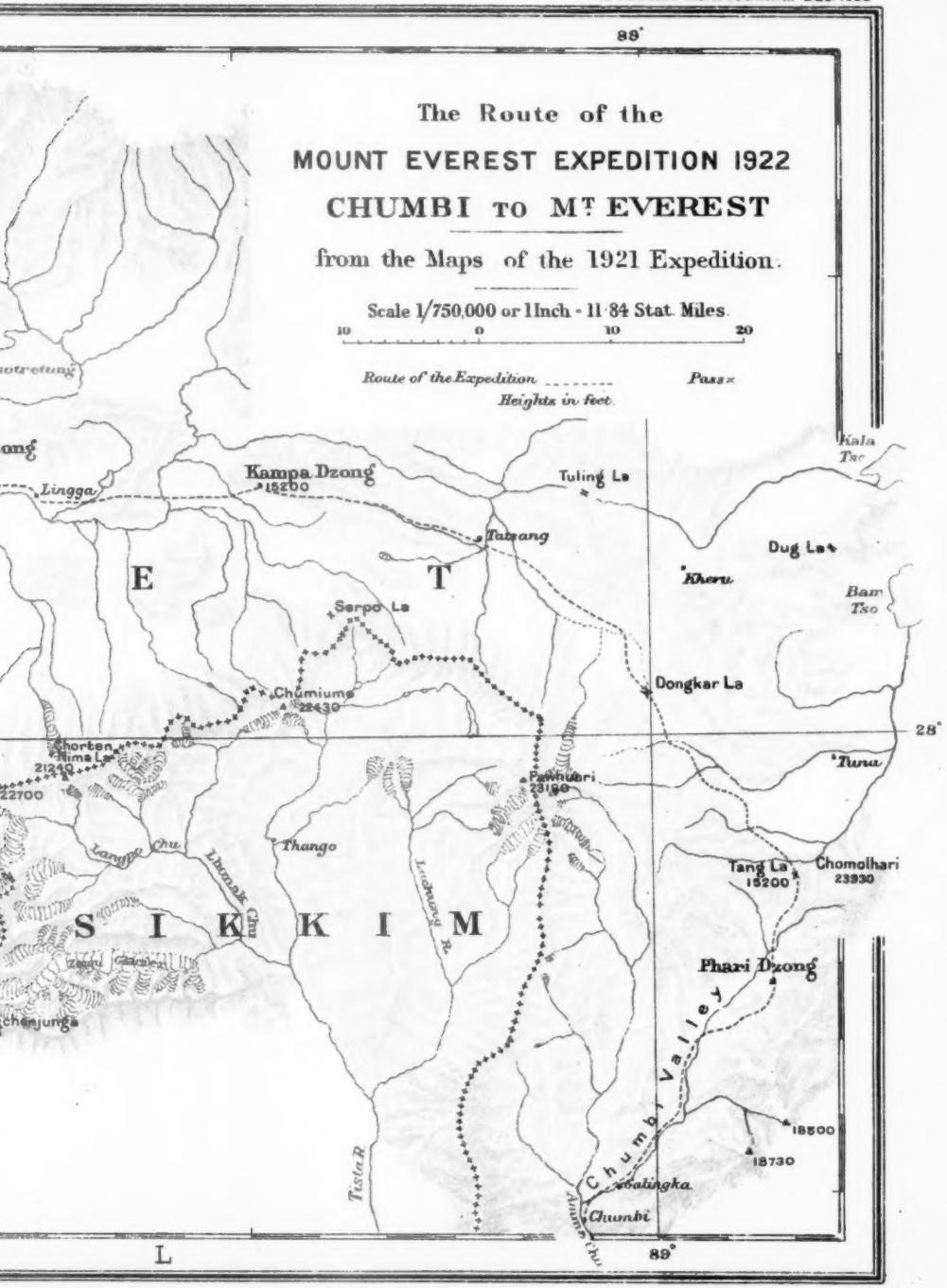

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ROYAL GEOGRAPHICAL SOCIETY

NOTICES

MEETINGS in the **ÆOLIAN HALL**, 135 New Bond Street, W.1, at **EIGHT-THIRTY** p.m.

Monday, Dec. 11. The Alps of Chinese Tibet and their Geographical Relationships . . . . . **Prof. J. W. Gregory.**

,, Jan. 15. The Yugo-Slavia—Hungarian Boundary . . . . **Lt.-Col. D. Cree.**

MEETINGS in the Society's House, Kensington Gore, at **FIVE** p.m.

Monday, Dec. 18. The Scheme for the proposed determination of Primary Longitudes by International Co-operation . . . **Col. Sir Gerald Lenox-Conyngham.**

CHRISTMAS LECTURES to Young People in the **ÆOLIAN HALL**, at **THREE-THIRTY** p.m.

Monday, Jan. 1. Up the Tigris . **Lt. Comm. A. S. Elwell-Sutton.**

Friday, Jan. 5. Antarctic Adventure . . . . . **R. E. Priestley.**

Admission will be by special ticket. Applications for tickets should be sent to the Chief Clerk, Royal Geographical Society, Kensington Gore, S.W.7, not later than Thursday, December 28, marked on the envelope "Christmas Lectures."

PHOTOGRAPH ROOM. The attention of Fellows is called to the series of photographs from the Mount Everest Expedition of 1922 now on view.

THE SOCIETY'S HOUSE. The House is open on week-days from 10 a.m. to 6 p.m., except on Saturdays, when it closes at 1 p.m. The House will be closed from 1 p.m. on Saturday December 23 until the morning of Wednesday, December 27.

By Order of the Council,
ARTHUR R. HINKS,
Secretary.

On behalf of the Mount Everest Committee: the Kinematograph Lecture, "**CLIMBING MOUNT EVEREST**" will be given each weekday at 3 and 8.30 at the **PHILHARMONIC HALL**, Great Portland Street, opening Dec. 6. Prices 8/6 to 1/3, including tax. Box office at the Hall. Tel. Mayfair 606.

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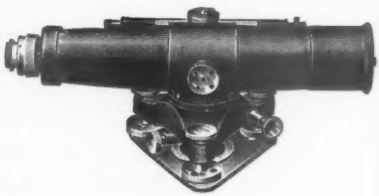

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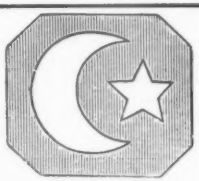
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A LIST of photographs from the Mount Everest Expedition of 1921 which have been reproduced in permanent carbon by The Autotype Company for sale, was included in the May 'Geographical Journal.'

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828.	North-east arête of Mount Everest (This the best single picture.)
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